

# REVISION OF THE GENUS *PHAEOCHROOPS* CANDÈZE (COLEOPTERA: SCARABAEIDAE, HYBOSORINAE)

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With 101 text-figures and four plates

## ABSTRACT

A revision of the species of *Phaeochroops* Candèze is given. The species recognized before this study are redescribed and seven new species are defined, viz., *P. colopacilis* (Vietnam), *freenae* (Malaya), *seres* (Vietnam), *ninbin* (Vietnam), *lakhonicus* (Thailand), *longisetosus* (India) and *vulturius* (Sumatra). For nine species lectotypes are designated, viz., *P. gigas* Arrow, *punctulatus* Arrow, *indicus* Arrow, *opacicolis* Arrow, *rattus* Arrow, *batuensis* Arrow, *mentaweiensis* Arrow, *niasianus* Arrow, *vulpecula* Arrow. Five forms are considered synonyms, viz., *P. niasianus* Arrow, *batuensis* Arrow and *mentaweiensis* Arrow are synonyms of *rattus* Arrow (*P. mentaweiensis* already synonymized by Arrow, 1942); *recticollis* Pic is a synonym of *silphoides* Fairmaire; *punctulatus* Arrow is a synonym of *gilleti* Benderitter (synonymy presumed by Arrow, 1942). Plates of four new species are given, as well as figures of male genitalia, sculpture of dorsal surfaces, and setosity for nearly all species. A key to the species, a checklist, and notes on bionomics and distribution are given.

## INTRODUCTION

This study is the second part of a revision of the Hybosorinae of South-East Asia. The first part (Kuijten, 1978) dealt with the species of *Phaeochroops* Castelnau and now the genus *Phaeochroops* Candèze, 1876, will be revised.

History. — Candèze (1876: 62) and De Borre (1886: 62) placed *Phaeochroops* near *Anaides* Westwood (now Hybosorinae) within the Troginae, although Candèze stipulated the similarity with the hybosorine *Phaeochroops*. Arrow (1907: 359 and 1909: 485-486), basing his conclusion as to the place of the genus on much more material and the use of some new characters, arranged *Phaeochroops* in the Hybosorinae. Schmidt (1913) listed the species and gave an extensive characterization of the genus. In 1942, Arrow composed a key to most of the species known at that time; probably due to war circumstances four species could not be studied. Bacchus (1978) published a complete list of Arrow's types. With the exception of *P. taiwanus* Nomura I could study the type material of all forms. Many original descriptions in this genus are very superficial and do not permit an exact recognition of the forms concerned. Genital characters are hardly ever mentioned,

and detailed data on sculpture and setosity are scarce. Therefore I considered it useful to give extensive descriptions of all species, as well as figures of parameres, sculpture and setosity.

Notes on the figures. — The figures are diagrammatic, drawn with the aid of a Wild M5 binocular microscope. The sculpture of the pronotum figured is from a small sample area immediately along the posterior margin, near the base of the scutellum; the sample area for the elytral sculpture lies between one-third and one-half of the elytral length, including the sutural and first discal costae, indicated by heavy arrows in the figures. Setosity of head, pronotum and elytra, figured in situ, is not drawn to scale; setae of full-drawn fringes, and all separately drawn setae are at actual, relative, lengths. The parameres are drawn in dorsal and lateral aspects, and in some cases in other aspects too; the terms "right" and "left" paramere refer to the dorsal aspect; equivalent parts in the various aspects are indicated by asterisks. Umbilicate punctures are indicated by a black dot in the puncture. The elytral suture is indicated by a vertical line.

#### Descriptions of the genus and the species

##### **Phaeochroops** Candèze

Candèze, 1876: 63 (description of genus, discussion of taxonomical place, type-species *P. lansbergei* Candèze).

De Borre, 1886: 61-62 (quotation of Candèze's description, discussion of taxonomical place).

Arrow, 1907: 359 (discussion of taxonomical place).

Arrow, 1909: 485-486 (discussion of taxonomical place).

Arrow, 1912: 38-39 (list of species).

Schmidt, 1913: 19-21, 31-32 (*Phaeochroops* keyed out against the other hybosorine genera, extensive description of genus, list of species).

Arrow, 1942: 927 (key to species).

Paulian, 1945: 36-37 (short description of genus, *P. lansbergei* erroneously cited as *P. candezei* Candèze).

Note. — The setosity is often partly rubbed off; it should be studied on well-preserved specimens, or its former presence, density and distribution should be inferred from the rubbed off sockets.

Short diagnosis. — Eyes normally developed, first segment of antennal club enclosing the greater part of second and third segments; dorsal and ventral surfaces with conspicuous setosity; lateral margins of pronotum and elytra fringed with setae of various lengths; elytral disc with a distinct sutural costa and three flat or weakly elevated more lateral costae; most punctures on elytral disc horseshoe-shaped; claws always simple; sexual differences in characters of mandibles, claws and hind legs; abdominal sternites completely fused, covered by a dense vermiculation.

Description. — Habitus: dark brown, hairy, pyriform beetles, 8.5-17.5 mm.

Colour: Dark reddish brown to blackish brown, margins often somewhat more reddish, due to weak transparency, setosity whitish to reddish brown.

Labrum: Subtrapezoidal; margins weakly, antero-lateral angles strongly rounded, disc shiny, with widely separated, shallow, subcircular punctures or ill-defined depressions, mostly bearing a semierect or forward-directed seta; mandibles protruding beyond labrum, apices strongly and angularly bent inward.

Clypeus and rest of head: Anterior margin of clypeus rectilinear, lateral margins rectilinear or weakly convex, converging towards anterior margin; eye-canthus strongly protruding, dorsally somewhat depressed and with a conspicuous tuft of variably long and dense setae at its antero-apical margin, varying in number from about five to 18; anterior margin bordered by a flat, variably elevated band, continued along lateral margins as an elevated, narrower, often sharp-topped ridge; this ridge is often bifurcate at base of eye-canthus, one branch continued along anterior margin of canthus, the other one prolonged towards inner margin of eye as a more or less high, often ill-delimited, smooth, round-topped elevation; derm shiny, variably densely set with round to elliptic punctures of variable size and depth, each one situated at the bottom of an ill-defined, round, elliptic or weakly angular, shallow depression, the depressions sometimes locally contiguous or coalescent, forming short, longitudinal or diagonal series; punctures on vertex mostly much smaller, less deep and often not situated in a depression; many punctures, except on vertex, with an erect seta of variable length.

Pronotum: Anterior margin, seen from above, nearly straight over most of its length, concave laterally before the distinctly protruding, sharp antero-lateral angles; lateral margins weakly convex or straight, their anterior halves somewhat converging towards anterior margin, posterior halves still less converging, or nearly parallel; postero-lateral angles subrectangular with more or less rounded apices, posterior margin bisinuate; anterior margin bordered by a flat, somewhat elevated band, narrowing and often somewhat higher shortly before antero-lateral angles, continued along anterior part of lateral margin mostly as a narrower, higher and more sharp-topped ridge; the ridge gradually and often strongly widening and more round-topped along posterior part of margin; posterior margin bordered by a narrow, often somewhat blackish zone, impunctate or with a scanty, transverse series of very small punctures, bearing short and fine setae; lateral margins sometimes serrulate; external part of the bordering ridge with a fringe of setae of variable size and density, often weakly transgressing on most lateral part of posterior margin; derm shiny, with circular to elliptic, simple or umbilicate punctures of variable size, depth and density, each puncture or most

at bottom of a shallow, poorly defined, roundish to weakly angular depression; locally the depressions form short, longitudinal or diagonal, contiguous or coalescent series; many punctures with an erect or reclined seta.

Elytra: Suture anteriorly bordered by a narrow, shiny, round-topped, impunctate costa, gradually wider and higher, and more round-topped in posterior direction; disc with three costae, the inner one or two nearly flat or distinctly elevated, the third one mostly represented only by a longitudinal band, impunctate, or much less punctate than the intercostal areas; a faint costa may be discernible on the lateral declivity; all costae obsolescent before or on apical declivity; costae mostly bordered by more or less distinctly seriate punctures; an accessory, very short costa, somewhat higher and more shiny than the normal ones, may be present between the bases of the second and third discal ones, near humerus; non-costal surface with horseshoe-shaped or, along margins, umbilicate to simple round punctures of variable size, density, and degree of seriation; often each puncture at bottom of an ill-defined, roundish depression, the depressions sometimes coalescent or contiguous longitudinally, over short distances; surface with short or long setosity of variable density, in most species arising from round punctures, much smaller than the horseshoes, in rare cases, however, situated in the horseshoes; setosity often restricted to series on or along the costae on dorsal surface, more evenly distributed on lateral and apical declivities; derm shiny or with a mat, silky aspect; humeral and apical umbones variably developed; intercostal areas flat or weakly concave, dorsal surface of both elytra together slightly curved from side to side, lateral and apical areas rather steeply declivous; epipleura approximately horizontally bent inward, somewhat concave, shiny, virtually impunctate except for a series of setigerous punctures along internal margin, rather wide anteriorly but strongly and gradually narrowing towards apex; lateral margins of elytra anteriorly weakly curved or straight, and distinctly diverging in posterior direction, strongly and convergently curved in posterior part, towards apex, margin often serrulate anteriorly; margin bordered anteriorly by a narrow, more or less sharp-topped ridge, gradually more round-topped, wider and lower posteriorly, completely obsolete shortly before apex; sutural angle often with a denticle; external part of lateral ridge with a variably dense, continuous or several times interrupted fringe, setae of fringe generally long near humeral umbone, gradually and often strongly decreasing in length, and sometimes density, in posterior direction, in some species considerably longer again shortly before apex.

Scutellum: Triangular or nearly parallel-sided, apex rounded, surface often slightly concave, basal half with some setigerous punctures, apical half smooth and shiny.

Pygidium: Subtriangular, margins and apex somewhat rounded; surface weakly convex, more or less shiny, with punctures of variable density, size and degree of confluency, and with a rather dense setosity, margins fringed with long and densely set setae.

Underside: Thoracic sternites with dense, longitudinal vermiculation and setae of variable size and density; abdominal sternites fused, more or less shiny and, except for the last one, densely vermiculate, the vermicules generally transverse medially (fig. 16), gradually more longitudinal laterally, set with slender, recumbent setae of variable length and density.

Legs: Fore tibia with three large teeth on external lateral margin, in general protruding in straight lateral direction; between the large teeth and basally of them the margin is closely denticulate, the denticles acute or blunt, variably numerous, mostly directed laterad, but a variable proportion of the series basally of the first tooth may be directed forward or backward; inferior surface with a longitudinal ridge, surmounted by in general 10 to 12 denticles and a series of long, erect setae (fig. 50), mostly both denticles and setae at distances weakly increasing from base to apex of tibia; middle and hind tibiae weakly widening towards apex, with several longitudinal series of long and dense setae, external surface often with a short, transverse, denticulate ridge at about half the length, set with some stout setae, sometimes reduced to some setigerous denticles; longer apical spur of hind tibia of variable length, shorter or longer than first tarsal segment.

Parameres: Highly asymmetrical and contorted.

Sexual dimorphism: Mandibles in ♂ more developed, more protruding and more angular than in ♀; claws of fore tarsi in ♂ at most slightly shorter than last tarsal segment, in ♀ considerably shorter (fig. 65); claws of middle and hind tarsi longer in ♂; hind tarsi relatively slenderer in ♂; apical spurs of hind tibia relatively longer in ♂ (fig. 15); often the crown of apical setae in hind tibia of ♂ longer and denser than in ♀; length ranges of ♀ in general somewhat wider than in ♂.

Type-species: *Phaeochroops lansbergei* Candèze, 1876.

#### Bionomics

For breeding experiments I kept several couples of *P. peninsularis* alive for some time, under the same circumstances and with the same negative result as described (Kuijten, 1978) for *Phaeochrous emarginatus* Castelnau; the insects were much more sluggish than *Phaeochrous*, only active at night, and they fed on meat and fish. I collected several species in limited numbers in Malaysia, in pitfall traps, baited with decaying fish, in rain forest; traps in other habitats in the same region did not attract any specimens. Collec-

tion labels indicate attraction by light and several kinds of carrion, in forest habitats, often at considerable altitudes.

### Distribution

I placed pitfall traps with decaying fish and chicken entrails in mountain forest habitats in Luzon, Philippines, but these did not yield a single specimen. Considering the nearly complete absence of other beetles in the traps, this may have been caused by the extremely rainy weather during my stay in Luzon. However, the reason for this absence may well be a biogeographical one. Except for the far western island of Palawan, no *Phaeochroops* at all are known from the Philippines, despite of some recent trials by local entomologists to collect them at my request. If the absence is real, the eastern limit of the genus would coincide with the border of the Sunda shelf (fig 1).

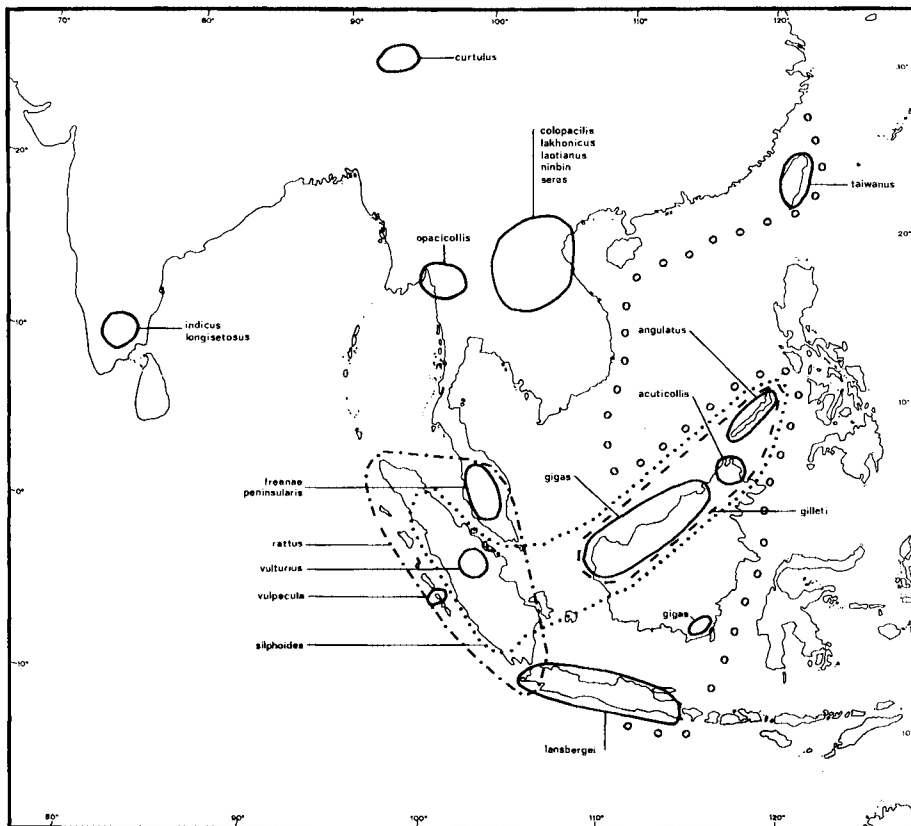


Fig. 1. Geographical distribution of *Phaeochroops*; O = eastern border of Sunda shelf.

In comparison with *Phaeochrous*, ranging from Senegal to Australia and Taiwan, the distribution is rather limited. The greatest number of species occurs in the continental areas of Indo-China and Malaya, and in Sumatra and Borneo with some of their satellites. This area, mountainous and heavily forested, may well be the area of origin of the genus. Only a few species occur, mostly in forested mountain areas, in India, Java and Taiwan; in a rich collection (Washington) of Hybosorinae, made at many places and in various months in Sri Lanka, the genus is not represented.

Key to the species of *Phaeochroops* (*P. taiwanus* excepted)

Note. — Lengths expressed as sum of lengths of head (distance between anterior margin of clypeus to line connecting most interior parts of eyes), pronotum, and elytra (distance between apex of scutellum to apex of elytron); in key exact to nearest half mm.

1. Fringe of elytral margins with some interruptions (fig. 74) . . . . . 2
- Fringe of elytral margin without interruptions . . . . . 3
2. Interruptions very distinct, setae slightly shortening from anterior to posterior part of fringe, but long everywhere, 13-16 mm, genital armature fig. 75, Malaya . . . . .  
*peninsularis* (p. 52)
- Interruptions short or hardly present (in case of doubt follow 3), setae of fringe strongly shortening in posterior direction, but strongly increasing in length shortly before elytral apex, 13-16.5 mm, genital armature fig. 31, northern Borneo . . . . .  
*gigas* (p. 25)
3. Elytral setosity whitish yellow, maximum length 10 mm, genital armature fig. 21, northeastern India . . . . .  
*curtulus* (p. 19)
- Setosity yellowish to reddish brown, length more than 10.5 mm, mostly more than 12 mm . . . . . 4
4. Setae of elytral fringe shortening from anterior to posterior, but considerably increasing in length shortly before elytral apex (fig. 30), in case of doubt (*P. indicus*) follow 7 . . . . . 5
- Setae of fringe shortening from anteriorly to apex, or at most with a weak increase in length before apex . . . . . 7
5. External surface of hind tibiae, at about half their length, with a transverse ridge, bearing some stout setae, 10.5-12.5 mm, genital armature fig. 41, southern India . . . . .  
*indicus* (p. 32)
- No transverse ridge in hind tibia, insular distribution . . . . . 6
6. Derm between elytral costae shiny, 13 mm, genital armature fig. 96, Mentawai Islands, Sumatra . . . . .  
*vulpecula* (p. 68)
- Derm mat, somewhat silky, 13-16.5 mm, genital armature fig. 31, northern Borneo . . . . .  
*gigas* (p. 25)
7. Intercostal setosity of elytra arising from large, horseshoe-shaped punctures (fig. 79), 9-11 mm, genital armature fig. 80, Malaya, Java, Sumatra and its western satellites . . . . .  
*rattus* (p. 55)
- Intercostal setae arising from simple, round punctures, much smaller than the surrounding horseshoes (eg., fig. 10), or intercostal setae virtually absent; exceptionally a few setae, both on costae and intercostal areas, in horseshoes much smaller than the non-setigerous ones, the rest in small, round punctures . . . . . 8
8. External surface of middle or hind tibiae or of both, at about halfway total length of tibia, with a short, subtransverse ridge, bearing some stout setae . . . . . 9

- Transverse ridge absent, or, on middle tibiae, sometimes a very weak one, composed of some setigerous denticles (in case of doubt follow also 9) . . . . . 16
- 9. Between bases of second and third discal costae of elytron a short, distinct accessory costa present (e.g., fig. 91), hardly any setae on discal costae . . . . . 10
- No trace of an accessory costa . . . . . 11
- 10. Length 12.5-13.5 mm, Philippines: Palawan, no ♂ known . . . *angulatus* (p. 14)
- Length 11.5-12.5 mm, Sumatra, genital armature fig. 101 . . . *vulturius* (p. 71)
- 11. Elytra with setae on both costae and intercostal areas . . . . . 12
- Elytral setosity restricted to middle and/or borders of costae, or to intercostal areas . . . . . 13
- 12. Elytral setosity showing distinct seriation on discal costae and along external border of sutural costa, but setosity not restricted to the costae; setae of marginal fringe of elytra more or less distinctly lengthened shortly before apex, tuft on eye-canthus with about 15 setae, genital armature fig. 41, 10.5-12.5 mm, southern India *indicus* (p. 32)
- Elytral setosity rather evenly distributed, not showing seriation on or along costae, fringe gradually decreasing in length, canthal tuft with 5-6 setae, 9.2 mm, southern India *longisetosus* (p. 43)
- 13. Elytral derm with a distinct silky aspect, elytral setosity virtually restricted to middle and borders of costae, costal setae arising from ill-defined horseshoes of approximately the same size as the intercostal ones, 15-17.5 mm, genital armature fig. 85, northern Vietnam, Laos *seres* (p. 60)
- Elytral derm shiny, setae arising from simple punctures, much smaller than the horseshoes . . . . . 14
- 14. Elytral setosity (fig. 63) virtually restricted to non-costal areas, some setae on borders of costae, 11-12.5 mm, genital armature fig. 64, northern Vietnam *ninbin* (p. 45)
- Elytral setosity restricted to costae . . . . . 15
- 15. Setosity in elytral disc (fig. 43) restricted to a more or less uniseriate, irregular row in middle of costae, length of setae in middle part of elytron about one-third of width of first intercostal area, apex of right paramere simple, 12.5-13 mm, genital armature fig. 44, Thailand *lakhonicus* (p. 35)
- Setosity mainly restricted to external borders of costae, sometimes also on top and internal borders, length of setae about one-fifth of width of first intercostal area, apex of right paramere bilobate, 15-16 mm, genital armature fig. 70, Tenasserim *opacicollis* (p. 48)
- 16. Between bases of second and third discal costae of elytra a short, but distinct accessory costa, as in fig. 91 . . . . . 17
- No accessory costa, or only a vestigial one (sometimes only discernible in one elytron) . . . . . 20
- 17. Setosity in central part of elytra restricted to a median series on discal costae and a lateral one on sutural costa; sutural setae distinctly shorter than discal ones, length of setae on discal costae approximately equal to width of intercostal spaces, setae mostly strongly reclined; intercostal areas mat, 13-15 mm, genital armature fig. 6, northern Borneo *acuticollis* (p. 11)
- Setosity both on elytral costae and non-costal areas, the non-costal setosity, sometimes, very scarce discally, in which case the costal setae are distinctly shorter than the width of the intercostal spaces . . . . . 18
- 18. Intercostal areas shiny, setae on costae widely separated, intercostal setae mainly irregularly distributed, 9-11 mm, genital armature fig. 90, Sumatra, Borneo, Palawan *silphoides* (p. 63)
- Intercostal areas mat, longer than 12 mm . . . . . 19
- 19. Costal setae uniseriate, widely separated (fig. 26); many intercostal setae; extreme basal margin of pronotum smooth, without setae, basal accessory denticles on external margin of fore tibia considerably widening from anterior to posterior, 13-13.5 mm, Malaya *freenae* (p. 22)



- Costal setae not uniseriate (fig. 35), closely set, suberect, intercostal setosity discally very scarce, basally, laterally and apically denser; posterior margin of pronotum with a series of distinct setae, setae of sutural and discal costae approximately equally long, basal accessory denticles in fore tibia virtually all of same size, 12.5-13 mm, genital armature fig. 36, northern Borneo, Palawan . . . *gilleti* (p. 28)
- 20. Costal setae widely separated, intercostal setae sparse and unevenly distributed, 10.5-14.5 mm, genital armature fig. 49, Java . . . . . *lansbergei* (p. 37)
- Elytral discal setosity restricted to borders of costae, continental . . . . . 21
- 21. Spaces between discal horseshoes on elytra often much smaller than diameters of horseshoes (fig. 14), most setae of elytral fringe shorter than the costal ones, and widely separated, 9-9.5 mm, genital armature fig. 15, northern Vietnam . . . . . *colopacilis* (p. 16)
- Horseshoes in general separated by considerably more than their diameters (fig. 54), setae of fringe rather crowded, most considerably longer than discal ones, 10.5 mm, genital armature fig. 55, Laos . . . . . *laotianus* (p. 40)

### **Phaeochroops acuticollis** Arrow

(figs. 2-6)

*Phaeochroops acuticollis* Arrow, 1907: 436 (diagnosis; type-loc. Borneo: Kina Balu).  
*Phaeochroops acuticollis* Arrow, 1942: 927 (compared with *P. punctulatus* Arrow; key).

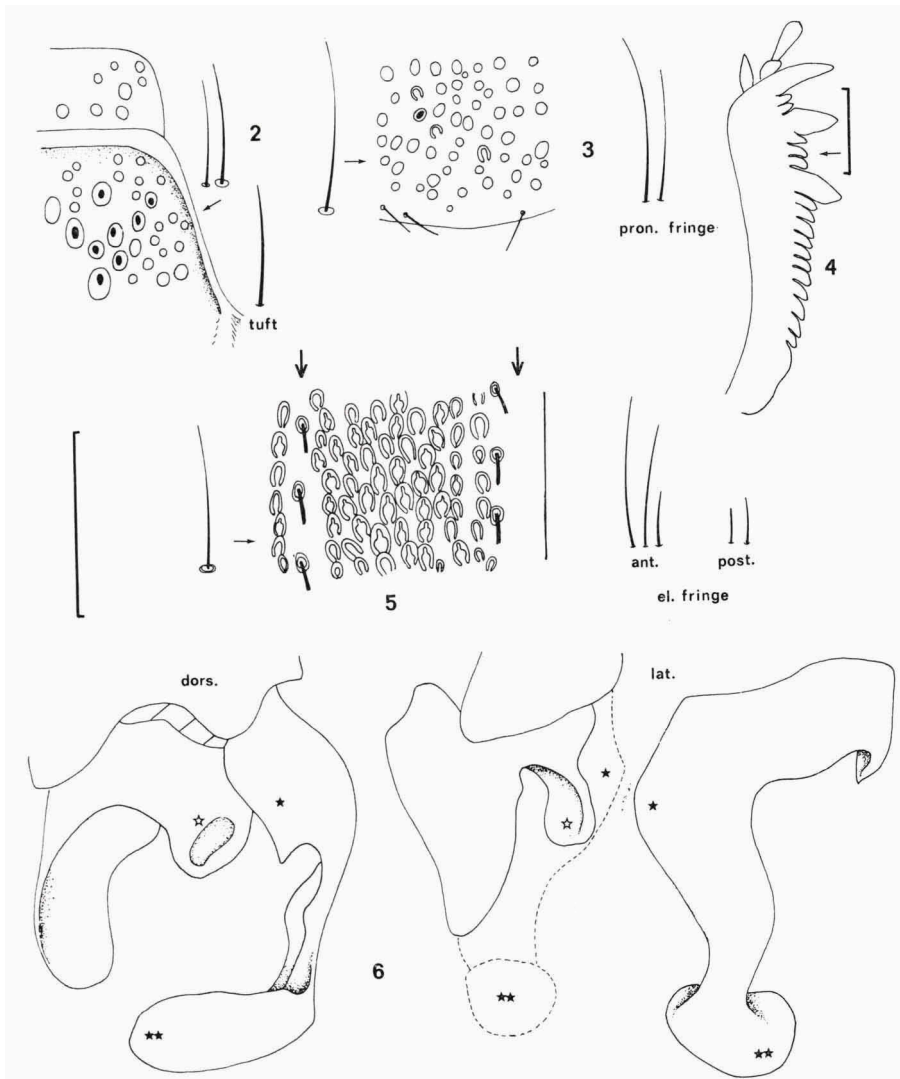
**Diagnosis.** — Apex of right paramere strongly bent inward and very thick; elytral fringe not interrupted; elytral setosity arising from small round punctures; no transverse ridge in middle and hind tibiae; accessory costa present; setosity of elytral disc restricted to costae.

**Redescription of ♀ holotype.** — Blackish brown with reddish yellow setosity. Length  $2.2 + 3.6 + 9.4 = 15.2$  mm.

**Labrum:** Anterior margin straight, sides slightly curved, convergent towards anterior margin; disc with some large setigerous shallow, partly confluent punctures.

**Clypeus and rest of head:** Anterior margin straight, sides approximately straight, weakly convergent towards anterior margin; anterior margin bordered by a flat, wide elevation, higher and narrower along margin, bifurcate at base of eye-canthus, one branch continued along anterior margin of eye-canthus, the other one, poorly defined and weakly elevated, prolonged towards inner margin of eye; surface glossy, set with deep, round to elliptical, often umbilicate, very unequal punctures; many punctures placed at the bottom of an ill-defined shallow depression; many punctures with a long erect seta; eye-canthus with a tuft of about ten setae at antero-lateral apex, most of approximately equal length as setosity on clypeo-frontal area; vertex with finer punctures and a small, median impunctate area.

**Pronotum:** Anterior margin (seen from above) straight over most of its length, concave laterally before the acute antero-lateral angles; sides more convergent in anterior than in posterior half, both halves approximately



Figs. 2-6. *Phaeochroops acuticollis* Arrow, holotype ♀. 2, Clypeus and labrum with setae of disc and canthal tuft; 3, punctation, discal and fringal setosity of pronotum; 4, right fore tibia; 5, punctation, discal and fringal setosity of elytra; 6, parameres of Borneo ♂. Scale lines represent approximately 1 mm.

straight; base bisinuate; anterior margin bordered by a flat, rather wide elevation, continued along lateral margin, narrow in anterior half, wider, more elevated and convex in posterior half; lateral margin locally weakly serrulate; external surface of this lateral ridge with a fringe of erect setae of various lengths, most of about same size as discal setae, and not shortening

in posterior direction; fringe less dense in posterior half of margin, except for a more dense series on rectangular postero-lateral angles, somewhat transgressing onto lateral extremity of posterior margin; posterior margin bordered by a narrow, glossy band with a transverse series of fine setigerous punctures; derm glossy, closely set with punctures of varying diameters, most more or less umbilicate, some of the larger ones horseshoe-shaped; many punctures at bottom of an ill-defined shallow depression, the depressions partly contiguous; many punctures with a long erect seta.

Elytra: Sutural costa relatively high and wide, slightly widening towards apex; three discal costae very narrow and slightly elevated; all costae more or less shiny; intercostal areas slightly concave, more or less mat like rest of elytral surface, somewhat contrasting with the more glossy costae; derm closely set with horseshoe-shaped punctures, more umbilicate in lateral and apical areas, where costae are obsolete; horseshoes bordering costae locally seriated, irregularly distributed everywhere else; a short accessory costa between bases of second and third discal costae; external margin of sutural costa with a series of reclined setae, somewhat shorter than those on discal costae; discal costae with a median series of about 20 rather coarse setigerous punctures, smaller than the horseshoes; setae long, slightly directed backward; except for apical declivity all non-costal areas without setosity. Lateral margin anteriorly obsoletely serrulate; margin bordered by a rather narrow round-topped ridge, gradually wider, higher and still more round-topped towards apex; external slope of this ridge with a not very dense fringe, formed by laterally directed setae of variable size, but generally long anteriorly, strongly decreasing in size in posterior half towards apex of elytron.

Pygidium: Glossy, closely set with setigerous punctures, apical and lateral margins densely fringed with yellow setae, somewhat longer than those on elytral costae.

Fore tibia: All accessory denticles basally of first tooth directed backward.

Middle and hind tibiae: no transverse carena at half their lengths.

♂: sides of pronotum hardly curved; middle of pronotal disc with a slight longitudinal impression in basal half; in elytra some intercostal setae along base; many elytral horseshoes with an extremely fine and short seta at apex of core; length  $2.5 + 3.3 + 9.4 = 15.2$  mm.

♀ from Paris: a few non-costal setae in basal and lateral areas of elytra; length  $2.1 + 3.0 + 8.1 = 13.2$  mm.

Type material. — Holotype ♀ in London (monotypy), labelled "Borneo, Kina Balu"; "Holotype", print in red ring; "60274", handwritten, yellow; "Whitehead", handwritten; "Fry Coll. 1905-100", print; "*Phaeochroops acuticollis* Arrow type A.a.M.1907", handwritten.

Material examined. — Apart from the holotype I studied one ♀ (Paris) from "N. Borneo, Kina Balu, Coll. v. d. Poll", one ♂ (Dresden) from "N.O. Borneo" and 3 ♀ from Sarawak, Mt Mulu Ntl Park, forest, 900-1700 m, pitfall trap (Leiden).

***Phaeochroops angulatus* Benderitter**

(figs. 7-10)

*Phaeochroops angulatus* Benderitter, 1923: 6 (diagnosis; type-loc. Philippines: Palawan).

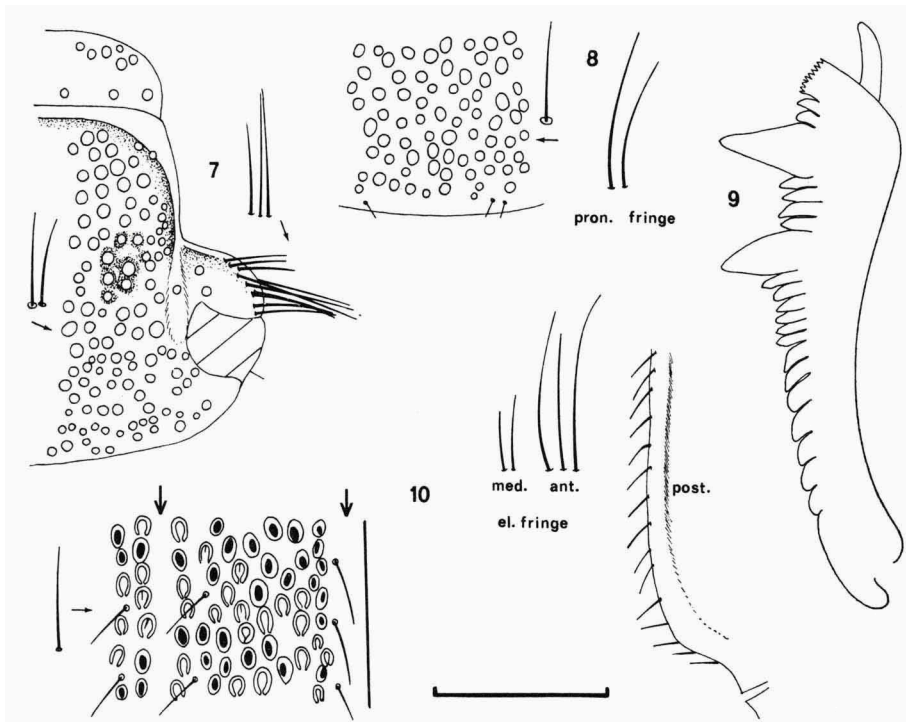
Diagnosis. — Elytral fringe not interrupted; elytral setosity arising from small round punctures; transverse ridge very distinct in middle tibia, weak in hind tibia; accessory costa present.

Redescription of ♀ holotype. — Head and pronotum nearly black, elytra dark reddish brown, setosity yellowish red; length  $1.7 + 3.0 + 9.0 = 13.7$  mm.

Labrum: Anterior margin weakly convex, sides slightly round, convergent towards anterior margin, disc glossy, with about 18 rather shallow setigerous punctures of varying diameters, distributed over whole surface.

Clypeus and rest of head: Anterior margin straight, lateral margins nearly so; anterior margin bordered by a flat elevation, continued along lateral margins as a more sharp-topped carena, bifurcate at base of eye-canthus, one branch continued along anterior margin of eye-canthus, the other one reaching inner margin of eye as an ill-delimited smooth and flat elevation; surface glossy, closely set with mostly subcircular punctures, each one situated at bottom of an ill-defined shallow depression, the depressions often nearly contiguous (some indicated in fig. 7); diameters of punctures considerably varying, the smallest and shallowest ones in a transverse band on vertex; many punctures bear an erect seta; a tuft of approximately 15 long erect setae on apex of eye-canthus.

Pronotum: Seen from above, the anterior margin is straight over most of its length, but concave near the sharp antero-lateral angles; lateral margins weakly angulate in middle, in anterior half very weakly concave and converging to anterior margin, in posterior half nearly parallel; posterior margin bisinuate; anterior margin bordered by a flat, smooth elevation, continued along lateral margins as a flat-topped ridge anteriorly, more round-topped posteriorly; posterior margin bordered by a glossy, nearly impunctate, very narrow band, with only a few widely separated, extremely fine, setigerous punctures on its posterior border; derm glossy, closely set with deep sub-circular punctures of varying diameters, each one situated at bottom of an ill-defined shallow depression; the depressions very close in basal and lateral areas, but leaving some small areas unaffected in anterior part of disc; most



Figs. 7-10. *Phaeochroops angulatus* Benderitter, holotype ♀. 7, Head with setosity; 8, punctation, discal and fringal setosity of pronotum; 9, left fore tibia; 10, punctation, discal and fringal setosity of elytra. Scale line represents approximately 1 mm.

punctures with a long, erect seta; external part of lateral ridge fringed with erect setae, longer than the discal ones, somewhat denser before and on the slightly obtuse postero-lateral angles.

**Elytra:** Sutural costa distinctly elevated, subtly widening towards apex of elytron, discal costae smooth and glossy, first one slightly elevated, second one not elevated, third one only locally present as a smooth and glossy band, indiscernible over much of its length; a short, smooth, rather high accessory costa present between bases of second and third discal costae; costae without setae except for apical parts of first and second discal ones with a few setigerous punctures; non-costal areas densely set with umbilicate or horse-shoe-shaped punctures, somewhat finer, rounder and simple on apical callus and declivity; most punctures situated at bottom of an ill-defined depression; derm glossy, weakly wrinkled between the depressions; punctures bordering costae distinctly seriate, for the rest irregularly distributed or forming short series; external border of sutural costa with a series of erect setae, placed

in very fine punctures, non-costal areas rather scatteredly set with long setae, irregularly distributed and arising from small round punctures, somewhat denser in lateral and apical declivities; many horseshoes with an extremely fine and short recumbent seta on apex of core, only visible under high magnification and under a certain angle of illumination; lateral margins bordered by a ridge, sharp-topped anteriorly, gradually wider and more round-topped towards elytral apex, obsolescent at extreme apex; external part of this ridge with a dense continuous fringe, setae long anteriorly, gradually and strongly decreasing in size towards apex; sutural angle with a denticle.

Pygidium: Disc closely set with round setigerous punctures on a glossy derm, setae fine, margins densely fringed with longer setae.

Fore tibia: Basal accessory denticles partly narrow, partly broader and directed backward.

Middle and hind tibia: Transverse carena in middle tibia very distinct, bearing some stout setae, in hind tibia only indicated by a single seta at the base of a weak spiniform elevation.

Variation of ♀: Anterior half of pronotal lateral margin less concave; lateral margins of pronotum, seen from somewhat laterally, poorly crenulate; lengths 12.5 and 13.4 mm.

Type material. — Holotype ♀ (by monotypy) in Brussels, labelled "Coll. R.I.Sc.N.B., Philippines Bacnit Palawan Collected by C. M. Weber ex coll. J. Gillet", yellow, print, but collector's and locality labels white, glued on the yellow one; "Holotype", purple, print; "*Phaeochroops angulatus* type, E. Benderitter det.", white, hand and print combined.

Material examined. — Apart from the holotype I saw 2 ♀ from Palawan (Dresden).

***Phaeochroops colopacilis* sp. nov.**

(figs. 11-16, pl. 1)

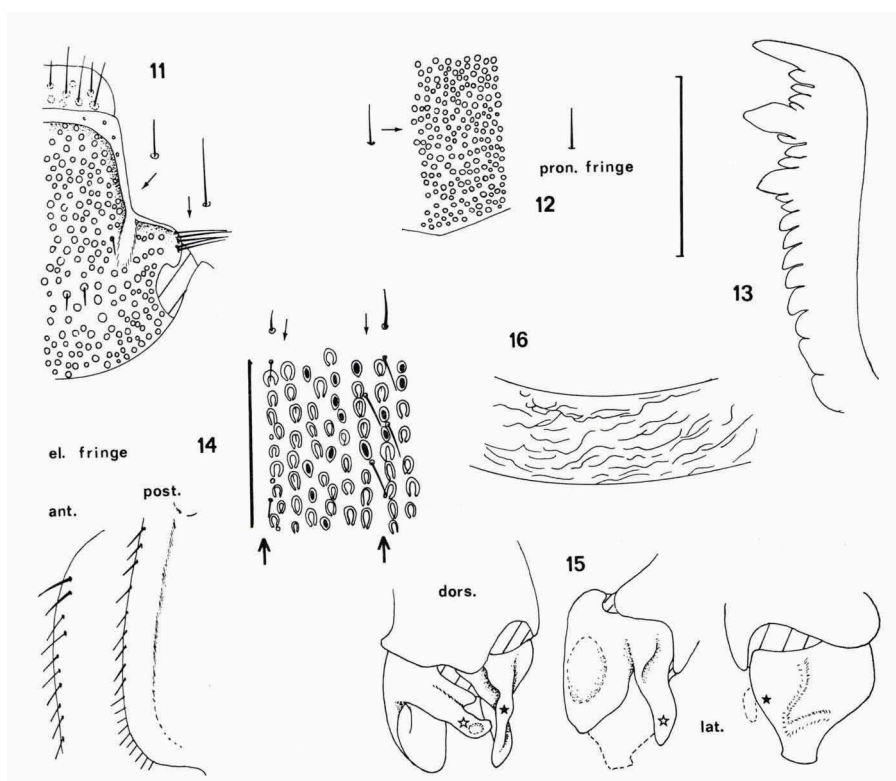
Diagnosis. — Dorsal and ventral lobes of left paramere about equally long; elytral fringe not interrupted; setae of fringe short, gradually shortening towards apex; elytral setosity arising from small, round punctures; no transverse ridge in middle and hind tibiae; no accessory costa; setosity on disc of elytra restricted to borders of costae.

Description of ♂ holotype. — Blackish brown with yellowish brown setosity; length  $1.1 + 2.2 + 5.9 = 9.2$  mm.

Labrum: Anterior margin nearly straight, sides convex and convergent towards anterior margin; disc shiny, with some ill-defined, shallow, widely separated, setigerous punctures.

Clypeus and rest of head: Anterior and lateral margins straight, the latter convergent in anterior direction; anterior margin bordered by a rather flat and wide elevation, narrower and higher along lateral margins; the elevation bifurcate at base of eye-canthus, one branch continued along anterior margin of canthus, the other one, rather wide and poorly delimited, prolonged to approximately middle of inner eye margin; derm glossy, densely set with deep round punctures, somewhat smaller on vertex and eye-canthus, situated at bottom of an ill-defined shallow depression; some punctures with a short, somewhat reclining seta; external margin of eye-canthus with a tuft of about six erect setae, about twice as long as the discal ones.

Pronotum: Anterior margin, seen from above, nearly straight, concave before the acute antero-lateral angles; lateral margins nearly straight and slightly convergent to anterior margin in anterior one-third, weakly convex



Figs. 11-16. *Phaeochroops colopacilis* Kuijten, holotype ♂. 11, Head with setosity; 12, punctuation, discal and fringal setosity of pronotum; 13, left fore tibia; 14, punctuation, discal and fringal setosity of elytra; 15, parameres; 16, middle of an abdominal sternite with vermiculation. Scale line represents approximately 1 mm.

and still less convergent in posterior two-thirds, postero-lateral angles rectangular, but apices strongly rounded, posterior margin weakly bisinuate; anterior margin bordered by a wide and flat elevation, gradually narrowing towards antero-lateral angles, and continued along lateral margins, anteriorly as a sharp-topped carena, gradually and slightly more elevated, wider and more round-topped towards postero-lateral angles; lateral margin serrulate, with approximately 22 denticles and a fringe of short setae, slightly bent backwards, and arising from the incisions between the denticles; posterior margin bordered by a very narrow smooth band, showing only a few minute inward directed setae; derm slightly shiny and very closely set with small, deep, round, irregularly distributed punctures; each puncture situated in an ill-defined shallow depression; some punctures umbilicate, mainly in lateral areas; many punctures with a recumbent seta of about the same length as fringal setae in middle of lateral margin.

Elytra: Sutural costa gradually and slightly widening, more round-topped and more elevated from anterior to posterior, glossy, unpunctured; the three discal costae weakly or not elevated, but well defined as punctureless bands, bordered on both sides by a row of strictly seriate horseshoe-shaped punctures; non-costal areas shiny, somewhat concave between the costae, with five or six more or less regular series of horseshoe-shaped, sometimes umbilicate, punctures; many horseshoes with an extremely fine and short recumbent seta on apex of core; borders of costae with a series of reclining short setae, arising from minute, round punctures; except for those series the intercostal areas are without setosity, but on lateral and apical declivities, where the costae have disappeared, more setosity is present and the majority of the punctures is umbilicate; setae along discal costae about twice as long as those on external border of sutural costa; lateral margin bordered by a narrow, sharp-topped ridge, gradually more round-topped towards apex, obsolete at apex; external part of this ridge with a fringe of short setae, directed backward, gradually diminishing in length towards apex; suture with apical denticle; no trace of an accessory costa near humeral umbone.

Pygidium: Minutely, transversely and irregularly rugulose, with many fine, more or less reclined setae, much denser along apical margin, long if compared with elytral setosity.

Abdomen: Sternites thinly set with long setosity.

Fore tibia: Basal accessory denticles partly directed forward, partly backward.

Middle and hind tibia: In middle tibia a weak transverse ridge in middle, with 1 or 2 stout setae.

Variation of ♀: Apart from the normal sexual differences and slight



variation in density and coarseness of punctures no differences with holotype; length of smallest specimen 9.2 mm, of largest one 9.4 mm.

Variation of ♂: Lateral serrulation of pronotum may be a shade denser; a weak variation in regularity of the intercostal series of horseshoes; setosity may be somewhat richer; a few intercostal setae may be present along base of elytra; lengths from 8.9 to 9.1 mm.

Type material. — Holotype ♂ (Budapest), labelled "Vietnam, Cuc Phuong, Ninh Binh, 6-18.v.1966 Exp. Gy Topál", "from trap in soil, nr 386", all print; 4 ♂, 5 ♀ paratypes with identical labels (Budapest, Leiden); 1 ♂ paratype with same locality but 11-17.v.1966 and "nr 361 from carcass" (Budapest); 1 ♀ paratype with same locality, but 5-18.v.1966 and "nr 385 from trap in soil" (Budapest); all specimens additionally labelled with my name and type labels.

Material examined. — Apart from the type material I saw one ♂ (London) from Don Van, Tonkin, sept. 1917, that I provisorily include here; the punctigerous depressions on pronotum tend to coalesce in series of 7-10, and the basal one of the three lateral teeth in fore tibia, which is well developed in the type series, is not longer and only weakly broader than the adjoining accessory denticles.

Derivation of name. — Anagram of *opacicollis*, the name of another species of *Phaeochroops* with very dense punctation on the pronotum.

### ***Phaeochroops curtulus* Schmidt**

(figs. 17-21)

*Phaeochroops curtulus* Schmidt, 1912: 202 (diagnosis; type-loc. Khasis).

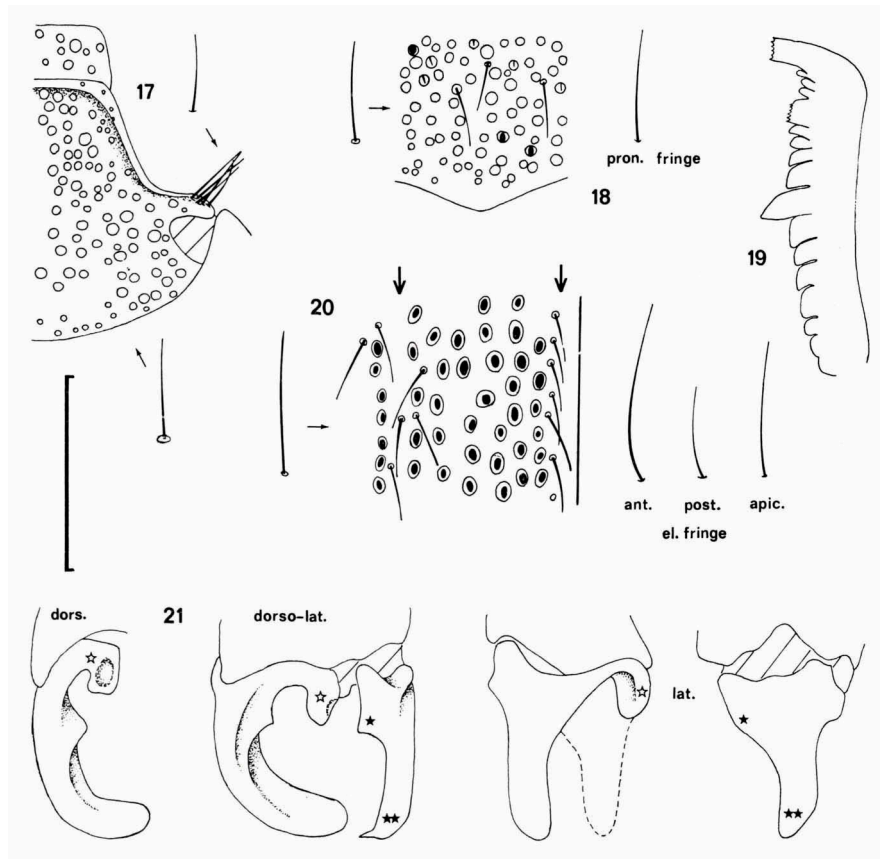
*Phaeochroops curtulus* Schmidt; Arrow, 1942: 927 (key).

Diagnosis. — Ventral lobe of left paramere strongly developed; elytral fringe not interrupted, fringal setae considerably increasing in length before apex of elytron; elytral setosity arising from small round punctures; no transverse ridge in middle and hind tibiae; accessory costa present; all setosity whitish; posterior margin of pronotum angular in middle.

Redescription of ♂ holotype. — Nearly black, setae yellowish white; length  $1.0 + 2.2 + 5.5 = 8.7$  mm.

Labrum: Anterior margin straight, sides straight, weakly converging to anterior margin, disc shiny, with approximately 20 widely separated setigerous punctures.

Clypeus and rest of head: Anterior margin nearly straight, sides straight, considerably converging towards anterior margin; anterior margin bordered by a flat elevation, continued along lateral margins, where it is slightly



Figs. 17-21. *Phaeochroops curtulus* Schmidt, holotype ♂. 17, Head with setosity; 18, punctation, discal and fringal setosity of pronotum; 19, left fore tibia; 20, punctation, discal and fringal setosity of elytra; 21, parameres. Scale line represents approximately 1 mm.

higher and narrower, obsolescent before apex of eye-canthus; surface shiny, densely set with subcircular deep punctures of varying diameters, many with a suberect, long seta; each puncture situated in a shallow, ill-defined depression; eye-canthus with an apical tuft of about seven setae, somewhat shorter than the discal ones; punctures on vertex more spaced and smaller than on clypeo-frontal surface, mostly without setae.

Pronotum: Anterior margin slightly concave, antero-lateral angles sharply protruding; lateral margins straight in anterior half, very weakly convex in posterior half, postero-lateral angles subrectangular, their apices strongly rounded; posterior margin bisinuate, the median meeting point of the sinuations slightly angulate, not rounded as in the other species; anterior and

lateral margins bordered by a low and narrow elevation, extreme lateral margin crenulate, fringed with erect setae of same length as discal ones, curved backward, gradually more dense towards postero-lateral angles, on which they form a distinct tuft; posterior margin bordered by a narrow band, smooth except for a scanty series of very fine setigerous punctures; surface shiny, densely punctate in lateral areas, slightly less so medially; punctures of strongly varying diameters, subcircular, mostly simple, umbilicate in a few cases, many of them situated in an ill-defined, shallow depression; some punctures with a long erect or reclined seta; some other long setae arising from much smaller and shallower punctures; some of the large punctures with an extremely fine and short recumbent seta.

Elytra: Sutural costa convex, slightly and gradually higher and wider towards apex; first discal costa only distinguishable as an ill-defined impunctate band, bordered on both sides by mostly regular series of punctures, second discal costa still less developed; non-costal surface shiny, set with mostly umbilicate punctures, elliptic on disc, subcircular on lateral and apical declivities, partially subseriate, with varying diameters; most punctures with an extremely fine recumbent seta, less than half the diameter of the puncture; apart from this coarse punctation, much smaller round punctures are sparsely and irregularly distributed over the non-costal areas, still more sparsely on the discal costae, somewhat denser along base and sides, and in a regular series along sutural costa, each one bearing a long erect or reclined seta; lateral margins densely serrulate, especially in apical area; margin bordered by a narrow ridge, more round-topped posteriorly, and obsolescent before apex of elytron; external part of this ridge rather densely fringed with more or less erect setae, anteriorly most somewhat longer than discal ones, decreasing in length in posterior direction, but longer again near extreme apex of elytron; sutural angle denticulate.

Pygidium: Surface shiny, rather closely set with small, partly confluent punctures, most bearing a long, fine, recumbent seta; setosity denser along margins.

Fore tibia: Only five broad basal accessory denticles.

Middle and hind tibiae: no median transverse ridge on external surface of these tibiae.

Variation of ♂ and ♀: Lengths ♂ 8.4-8.5 mm, ♀ 9.2-9.8 mm; some more basal accessory denticles may be present in fore tibia; elytral setosity may be much richer; on disc mainly concentrated near the costae, though not very dense nor seriate; on lateral and apical declivities more evenly and irregularly distributed; series of setae bordering sutural costa much denser; the discal costae may be slightly elevated and bear some more setae.

Type material. — Holotype ♂ in Dresden (by monotypy: all specimens studied bear identical locality and collection labels, but except for the type may be assumed to be identified by Boucomont in the 1930's; furthermore Schmidt gives only one length), labelled "Khasi's, Jan. 1895, Nat. Coll.", print, month and year crossed off; "Coll. C. Felsche Kauf 20, 1918", print, yellow; "Typus *Phaeochroops curtulus* A. Schm.", red, Typus print, rest handwriting; "*Phaeochroops curtulus* Type A. Schmidt", hand; "*Phaeochroops curtulus* 75" in same hand.

Material examined. — Apart from the holotype I saw 2 ♀ (Paris) with the same Khasi and Felsche labels as in holotype, plus an identification label (*P. curtulus*) in Boucomont's hand in one specimen; 2 ♂ and 2 ♀ (Dresden, Leiden), three of which with same Khasi and Felsche labels as in holotype, the fourth with "Khasia Hills" plus Felsche label and an identification label of Boucomont, 193. (last figure not filled in).

***Phaeochroops freenae* sp. nov.**

(figs. 22-26, pl. 2)

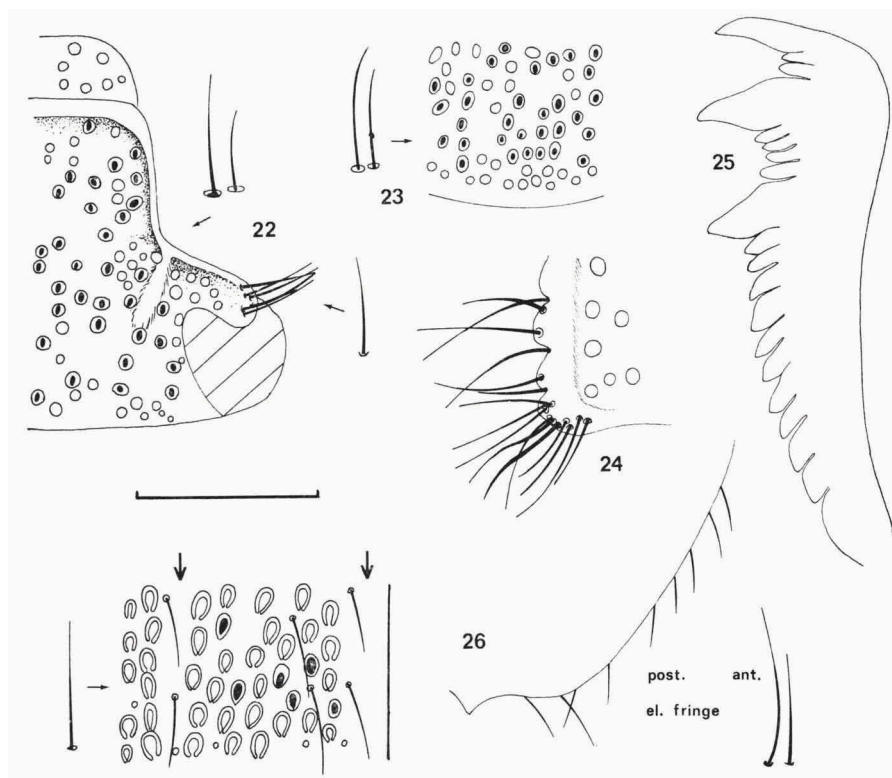
Diagnosis. — Elytral fringe not interrupted; elytral setosity arising from small round punctures; accessory costa present; intercostal areas mat; costal setae widely separated; no transverse median ridge in middle and hind tibiae.

Description of ♀ holotype. — Dark reddish brown, sutural costa, elytral and pronotal margins more reddish, setosity reddish brown; length  $1.6 + 3.0 + 8.6 = 13.2$  mm.

Labrum: Anterior margin slightly convex, sides slightly convex, convergent towards anterior margin; disc glossy, with a few shallow, unequal, setigerous punctures.

Clypeus and rest of head: Anterior margin approximately straight, lateral margins straight and weakly converging in anterior direction; anterior margin bordered by a rather wide and flat elevation, continued along lateral margins where it is gradually narrowing and higher; the elevation bifurcate at base of eye-canthus, one branch reaching apex of canthus, the other one somewhat wider, flatter, more round-topped, rather ill-delimited, prolonged in posterior direction; whole surface shiny, set with umbilicate round punctures of varying diameters, leaving much of surface unoccupied; many punctures at bottom of a shallow ill-defined depression and bearing a variably long, erect seta; apex of eye-canthus with a tuft of about 7 long, erect setae.

Pronotum: Anterior margin, seen from above, straight in middle, strongly concave before the acute antero-lateral angles; lateral margins irregularly serrulate, straight, rather convergent in anterior half towards anterior margin, much less so in posterior half; postero-lateral angles subrectangular, apices



Figs. 22-26. *Phaeochroops freenae* Kuijten, holotype ♀. 22, Head with setosity; 23, punctation and discal setosity of pronotum; 24, postero-lateral angle of pronotum with fringe; 25, left fore tibia; 26, punctation, discal and fringal setosity of elytra (posterior part of elytron full-drawn). Scale line represents 1 mm.

rounded; basal margin bisinuate; anterior margin bordered by a slightly elevated smooth flat band, narrowing and slightly higher before antero-lateral angles; this band continued along anterior half of lateral margin, gradually obsolescent in posterior half and only present as a narrow, weakly convex, smooth band here, occupying also postero-lateral angles; posterior margin bordered by an impunctate, narrow, nearly black zone; surface shiny, with deep punctures, nearly all at bottom of an ill-defined shallow depression, the larger punctures often umbilicate, or, laterally, nearly horseshoe-shaped, many with a long erect seta; diameters of punctures strongly varying, the largest ones, in lateral areas, more than twice the diameter of the smallest ones, mainly situated before middle of base; lateral elevation with a fringe of erect setae, much denser at postero-lateral angles and occupying also most lateral part of posterior margin; setae of fringe and disc of approximately same size.

Elytra: Sutural costa round-topped, weakly elevated at base, gradually increasing in width and elevation and more round-topped over greatest part of its length, with distinct apical denticle; the three discal costae slightly and flatly elevated, somewhat narrowing towards apical declivity, obsolescent here; costae very distinct as more or less shiny, nearly impunctate bands between the rather dull, silky, non-costal areas; a short, rather elevated accessory costa present between bases of second and third costae; intercostal spaces somewhat concave and, like the rest of non-costal surface, set with oblong, horseshoe-shaped or umbilicate punctures, more round in apical region; most punctures along costae in regular series, remaining ones irregularly distributed, but locally subseriate; punctures only occasionally situated at bottom of a shallow ill-defined depression; external margin of sutural costa with a series of suberect to reclining rather long setae; discal costae with an approximately median series of very widely separated long erect setae, somewhat denser on the most lateral costa; non-costal surface with sparse setae, more or less concentrated in series at some distance of the margins of the costae; all setae arising from round punctures, much smaller than the horseshoes; lateral margin serrulate anteriorly, smooth in posterior two-thirds; margin bordered by a sharp carena, slightly widening and more round-topped towards elytral apex, obsolescent shortly before apex; setae of marginal fringe widely separated, basally slightly longer than discal setae, gradually and strongly diminishing in length and diameter from about middle towards apex of elytron.

Pygidium: Densely set with fine punctures and with a sparse long setosity; margins with long setae, extremely dense along apical margin.

Fore tibia: Distances between denticles of series on underside of tibia increasing towards tibial apex; lateral accessory denticles rather acute and directed backward.

Middle and hind tibia: No transverse ridges at about half the length.

Variation of ♀: Setosity of discal costae slightly denser, especially near apical declivity; setae of fringe in apical region of elytra somewhat less short; punctures of head still more widely spaced; length 13.6 mm.

Type material. — Holotype and paratype ♀, labelled "vic. Kuala Lumpur, Malaysia 7.1976, 16 mi Ulu Gombak"; "Rain forest, 300 m., trap with decaying fish"; "leg. F. Bouricius"; my name and type labels (holotype Leiden, paratype coll. Kuijten).

Material examined. — Only the two type specimens known.

Derivation of name. — Dedicated to my devoted companion in many beetle-hunting trips, Mrs Freena Bouricius, who collected the specimens from an extremely nauseating bait.

**Phaeochroops gigas** Arrow

(figs. 27-31)

*Phaeochroops gigas* Arrow, 1907: 436 (diagnosis; type-loc. Borneo: Pengaron).*Phaeochroops gigas* Arrow, 1942: 928 (key).

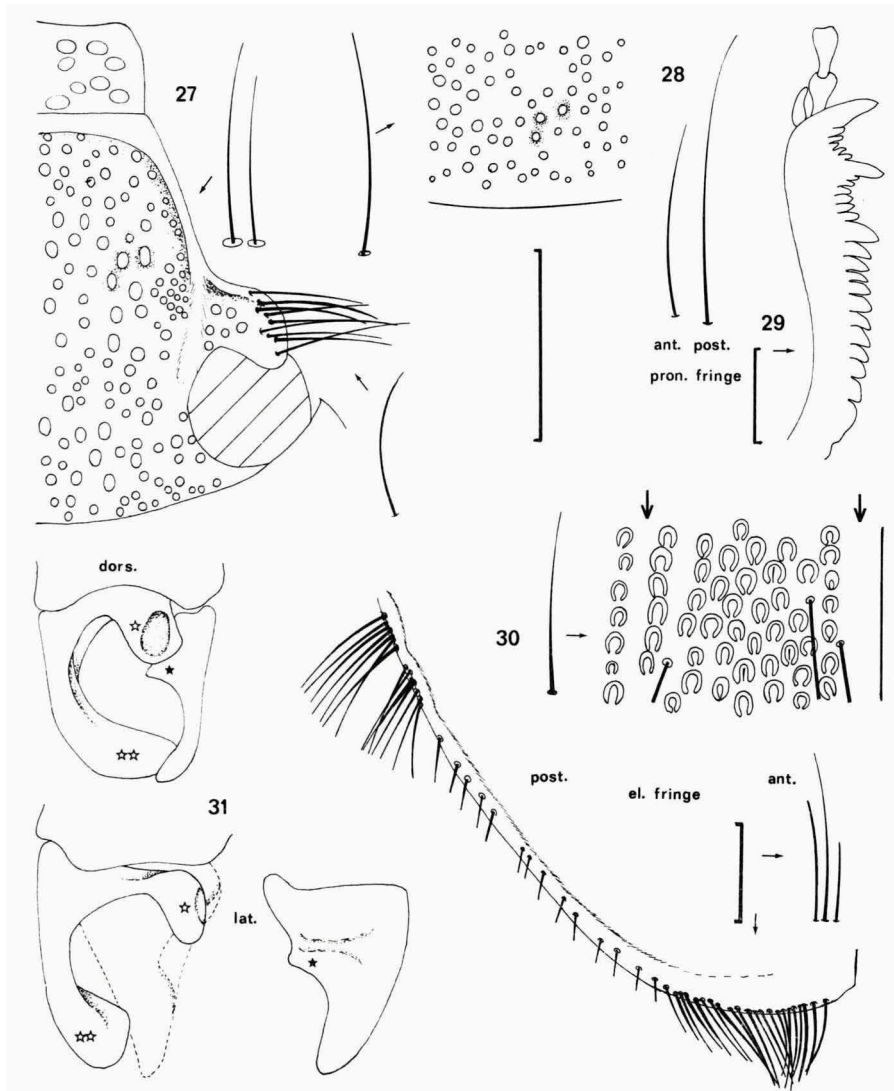
Diagnosis. — Left paramere with strong lower lobe, right paramere more or less triangular in lateral aspect; elytral fringe with short interruptions or complete; length of fringal setae strongly increasing before elytral apex; elytral setosity arising from small round punctures; no transverse ridge in middle and hind tibiae; setosity reddish brown; intercostal areas mat.

Redescription of ♂ lectotype. — Blackish brown, setosity reddish brown; length  $2.3 + 3.6 + 9.4 = 15.3$  mm.

Labrum: Anterior margin very weakly emarginate, nearly straight, lateral margins straight and slightly converging towards anterior margin, disc with about 18 shallow, poorly defined, more or less transverse, setigerous punctures, setae directed forward.

Clypeus and rest of head: Anterior margin straight, lateral margins straight, converging towards anterior margin; anterior margin bordered by a weak, flat elevation, slightly higher, narrower and more sharp-topped along lateral margin; at base of eye-canthus the elevation bifurcates, one branch continued along anterior margin of eye-canthus, the other one, flatter, more round-topped and poorly defined, prolonged towards inner margin of eye; surface shiny, rather evenly set with elliptic to round punctures, much finer and less deep on vertex; most of the coarser punctures in an ill-defined, shallow depression (some indicated by fine dotting in fig. 27), and most with a long, erect seta; eye-canthus with an apical tuft of about 18 erect setae.

Pronotum: Anterior margin, seen from above, nearly straight in middle, concave before the acute antero-lateral angles, lateral margins nearly straight and somewhat convergent towards anterior margin in anterior half, sub-parallel in posterior half; posterior margin weakly bisinuate; anterior margin bordered by a narrow, rather flat, impunctate, weakly elevated band; this band continued along lateral margins as a low, narrow, somewhat sharp-topped ridge, gradually more round-topped and slightly wider in posterior half; lateral margin finely serrulate; posterior margin bordered by a narrow, smooth, nearly black, impunctate zone; derm glossy, set with subcircular, umbilicate punctures of varying diameters, many of them situated at bottom of an ill-defined, shallow depression (fine dotting in fig. 28) and bearing a long erect seta; a faint median, longitudinal, narrow impunctate band in anterior half of pronotum; lateral margins with a dense fringe, consisting of very long, erect setae, still denser and longer before postero-lateral angles, which are rectangular with round apices.



Figs. 27-31. *Phaeochroops gigas* Arrow, ♂ of Mt Dulit. 27, Head with setosity; 28, punctation, discal and fringal setosity of pronotum; 29, right fore tibia; 30, punctation, discal and fringal setosity of elytra (posterior part of elytron full-drawn); 31, parameres of lectotype. Scale lines represent approximately 1 mm.

Elytra: Sutural costa round-topped, smooth and shiny, gradually higher and slightly wider towards apex, no apical denticle; first and second discal costae hardly elevated, mainly indicated, like the very weak third one, as narrow, slightly silky, impunctate bands; non-costal areas partly concave



and densely set with rather coarse and short horseshoes, most carved directly in the dull, slightly silky derm (not at bottom of shallow depressions), in apical area only annular punctures; horseshoes bordering costae rather regularly seriate, irregularly distributed everywhere else; disc sparsely, lateral and apical areas more densely set with slightly reclining or erect setae, arising from very small, subcircular punctures; an occasional seta implanted in the discal costae; some horseshoes with an extremely fine and short recumbent seta; a short trace of an accessory costa is present between bases of second and third discal costae; lateral margin finely serrulate, the serrulation obsolescent apically; margin bordered by a narrow sharp-topped ridge, wider and more round-topped in posterior direction and obsolete before apex of elytron; external part of this ridge with a dense fringe of long erect setae, slightly directed backward, rather abruptly decreasing in length and density shortly after middle of margin, but strongly increasing again in length and density at apex.

Pygidium: Disc densely set with fine punctures, most bearing a reclined seta; margins with a dense fringe of long setae, partly even longer than elytral discal ones.

Fore tibia: Basal large tooth and most of the basal accessory denticles somewhat directed backward.

Middle and hind tibiae: No trace of a median, transverse, setigerous carena on external surface.

Variation of ♂ and ♀: the median impunctate band in pronotum may be somewhat more developed; in well preserved specimens setosity richer: pronotal fringe very dense, most punctures on head and pronotum setigerous, a great proportion of the elytral horseshoes with a minute seta; slight variations in relative size, density and seriation of punctures may occur; interruptions in elytral fringe may be absent; posterior margin of pronotum, especially medially, may be somewhat swollen.

Type material. — Lectotype ♂ (London), here designated, labelled "Doherty"; "Syntype", print, in blue ring; "Type", print, in red ring; "Borneo Pengaron"; "Fry Coll. 1905-100"; "*Phaeochroops gigas* type A.a.M. 1907" in Arrow's hand; Bacchus's name and syntype label; my lectotype label. Paralectotype ♀ (London), here designated, labelled "♀"; "Syntype", print, blue ring; "28065"; "Doherty"; "Borneo Pengaron"; "Fry Coll. 1905-100"; Bacchus's name and syntype label; my paralectotype label.

Material examined. — Apart from the two type specimens I studied 1 ♂ from Brunei (Paris), 1 ♂ from Borneo (London), 9 ♂, 10 ♀ (Leiden, London) from Sarawak, foot of Mt Dulit, captured at several dates in september and october 1932 at light, in fish and goat traps, 2 ♂, 1 ♀ from Mt Mulu

National Park, Sarawak, in fish bait trap in forest, 100-500 m. (coll. Kuijten, Leiden).

Note. — I did not see, nor did Bacchus (1978), the Perak specimens mentioned by Arrow in his original description.

***Phaeochroops gilleti* Benderitter**

(figs. 32-36)

*Phaeochroops gilleti* Benderitter, 1923: 5 (diagnosis; type-loc. W. Borneo: Matang).

*Phaeochroops gilleti* Benderitter; Arrow, 1942: 927 (*B. punctulatus* Arrow, 1942, may be a synonym of *P. gilleti*).

*Phaeochroops punctulatus* Arrow, 1942: 926 (diagnosis; type-loc. Matang; key; discussion of synonymy with *P. gilleti* Benderitter). **Syn. nov.**

Diagnosis. — Right paramere with a large transparent area, its lower lobe long and slender; elytral fringe without interruptions; elytral setae arising from small round punctures; no transverse median ridge in middle and hind tibiae; a short accessory costa is present; intercostal areas mat; costal setosity closely set; extreme posterior margin of pronotum with well developed series of inward directed setae.

Redescription of ♂ holotype. — Agreeing with Arrow's presumption (1942) I consider *P. punctulatus* Arrow a synonym of *P. gilleti* Benderitter, basing this opinion on virtually perfect genital and external similarity. For its better condition I will give figures and a full redescription of the lectotype of *P. punctulatus* (see below) and restrict the redescription of *P. gilleti* to quoting the differences with the *P. punctulatus* lectotype — all falling within the variability of the species —: length  $1.9 + 3.0 + 8.1 = 13.0$  mm; fringe somewhat denser at postero-lateral angles of pronotum; setosity slightly richer; (elytral fringe present — in contradiction to Benderitter's citing of a fringe only present near base of elytron).

Variation of ♂ and ♀: lengths of both paratypes 12.6 mm, lengths of other specimens balance close to 13 mm; lateral margins of pronotum may be gently sinuate before postero-lateral angle; fronto-clypeal punctation may be somewhat coarser and less dense.

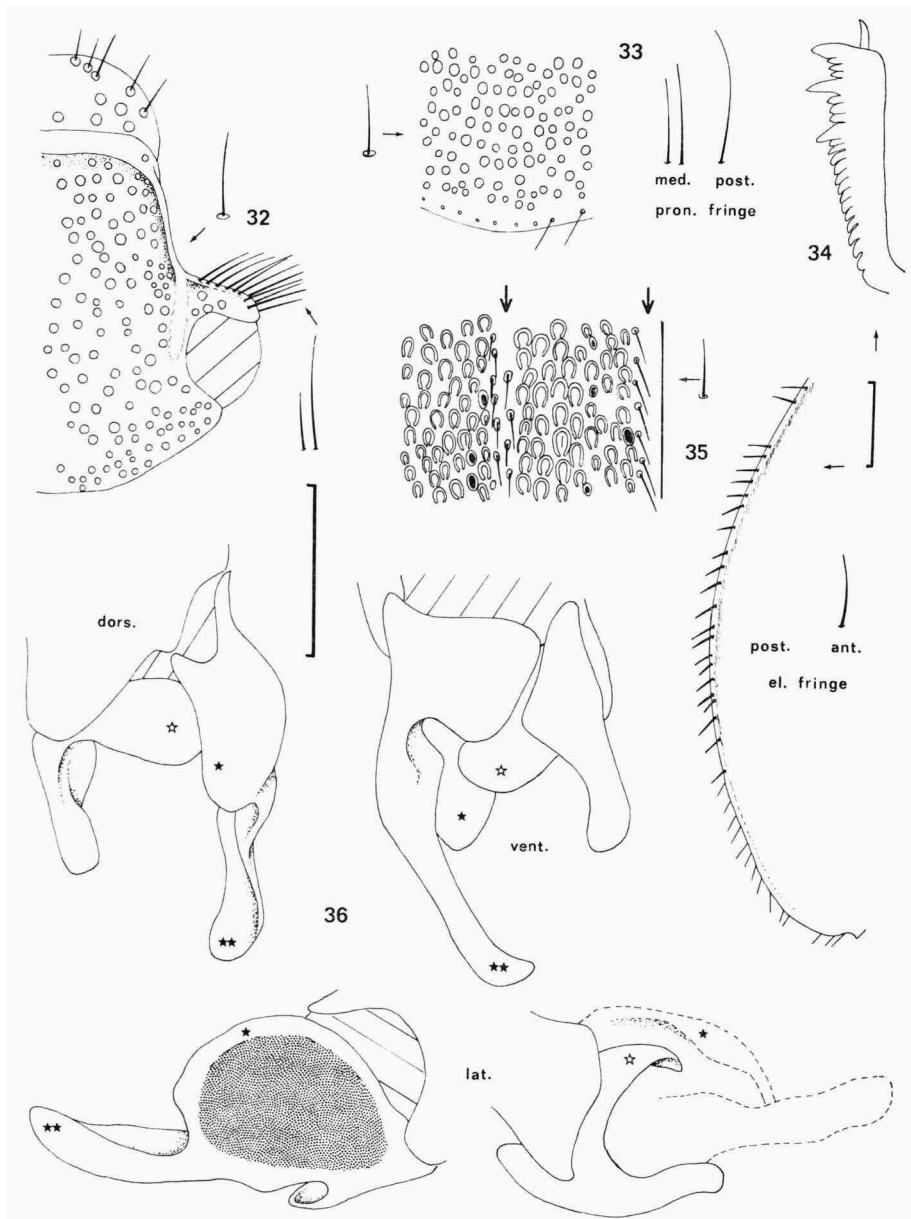
Type material. — Holotype ♂ (Paris), by original designation ("type: ma collection, cotypes: coll. Gillet"), with labels "W. Borneo Matang", print; "Matang Dec. 1898", combined print and hand; "Type", red, print; "*Phaeochroops gilleti* type E. Benderitter det.", print and handwriting combined. Paratype ♂ (Brussels), "W. Borneo Matang", print, glued on yellow museum label; "Paratype", print, orange; "ex coll. J. Gillet, Coll. R.I.Sc.N.B", yellow, print; "Matang, jan. 1899", hand and print combined; "*Phaeochroops gilleti* co-type E. Benderitter det.", combined hand and print. Paratype ♀ (Brussels) identically labelled, but without Benderitter's cotype label.

Material examined. — Apart from the type specimens I studied 2 ♂ and 2 ♀ (Leiden) from Goenoeng Kenepai (appr. 300 kms NEE of Pontianak, Borneo); 3 ♂ and 3 ♀ (Dresden) from N.E. Borneo and Kina Balu; 1 ♂ (Paris) from Kina Balu; 1 ♂ (Dresden) from Palawan, 4 ♂, 3 ♀ (coll. Kujiten, Leiden) from Mt Mulu National Park, Sarawak, Borneo, from pitfall traps with fish bait in forest. Of *Phaeochroops punctulatus* I saw the following specimens: lectotype (here designated) ♂, labelled "Syntype", print, blue ring; "Type", print, red ring; "Sarawak: Matang, 3-13.vii.1909. C. J. Brooks. B.M. 1936-681", print; "1.96", hand; "*Phaeochroops punctulatus* type Arrow", Arrow's hand. Paralectotypes (here designated): ♂ labelled "Syntype", print, blue ring; "Mt Merinjak, Sarawak G. E. Bryant 26.v.14 2000 ft", print and hand combined; "B 23"; "G. Bryant Coll. 1919-147"; "*Phaeochroops punctulatus* Arrow cotype", Arrow's hand; 3 ♂ labelled "Syntype", print, blue ring; "Kina Balu"; "Coll. Kraatz", "Berl. Ent. Inst. B.M. 1924-478", all print; ♀, "Syntype", print, blue ring; "River-side", "Near house", "Native collected", all print; "Sarawak Mt Kalulong. Long Manian 8.xi.1932", print and hand combined; "Oxford Univ. Exp. B. M. Hobby & A. W. Moore, B.M. 1933-254", print; "M 516", pencil; ♀ labelled "Syntype", print, in blue ring; "Trap fish"; "H 331"; "Sarawak foot of Mt Dulit, Junction of rivers Tinjar & Lejok, 25.ix.1932"; Oxford label as in preceding specimen. All specimens of *punctulatus* in London, additionally labelled with Bacchus's identification and syntype labels, and my (para)lectotype labels.

Redescription of ♂ lectotype of *Phaeochroops punctulatus* Arrow (figs. 32-36). — Dark reddish brown, all margins a shade lighter, setosity yellowish brown; length  $1.6 + 2.8 + 7.9 = 12.3$  mm.

Labrum: Approximately semicircular, disc shiny with about 14 unequal, setigerous punctures, mostly well separated, and distributed over whole surface.

Clypeus and rest of head: Anterior margin straight, lateral margins approximately straight, weakly converging towards anterior margin; anterior margin bordered by a flat and rather wide elevation, continued along lateral margins as a much narrower and somewhat more elevated ridge; the ridge bifurcate at base of eye-canthus, one branch extending over a short distance along anterior margin of eye-canthus, the other one prolonged to inner margin of eye as a weak, smooth, poorly delimited elevation; derm shiny, set with deep, more or less round punctures of various diameters, each one situated at bottom of a shallow, ill-defined depression; depth of depression and puncture proportionate to their diameters, most depressions well separated, some coalescent; vertex with much finer punctures; most of the large



Figs. 32-36. *Phaeochroops gilleti* Benderitter, lectotype ♂ of the synonym *P. punctulatus* Arrow. 32, Head with setosity; 33, punctuation, discal and fringal setosity of pronotum; 34, left fore tibia; 35, punctuation, discal and fringal setosity of elytra (posterior part of elytron full-drawn); 36, parameres; grey area transparent. Scale lines represent approximately 1 mm.

punctures with an erect seta; eye-canthus with a series of about 15 erect setae, some of which are longer than the fronto-clypeal ones.

Pronotum: Anterior margin, seen from above, nearly straight in middle, concave laterally before the acute antero-lateral angles; lateral margins weakly curved and convergent towards anterior margin, posterior margin bisinuate; except for its most lateral parts the anterior margin lacks the usual flat, bordering elevation; lateral margins bordered by a rather wide elevation, flat-topped in anterior two-thirds, slightly round-topped in posterior part; this elevation set with a fringe of erect setae, anteriorly somewhat longer than discal ones and rather randomly distributed over the elevation, posteriorly gradually longer, denser and more seriate, and transgressing over a short distance on posterior margin; postero-lateral angles rectangular; posterior margin bordered by a narrow, shiny band, somewhat thickened laterally, punctureless except for a series of short, fine, inward directed setae arising from minute, round punctures; surface shiny, densely set with deep, subcircular, mostly umbilicate punctures, slightly elliptic or horseshoe-shaped laterally, each one at bottom of a more or less distinct, shallow depression; the depressions mostly well separated, but locally confluent; many punctures with erect setae of somewhat varying lengths.

Elytra: Sutural costa shiny, round-topped, gently increasing in width and elevation towards elytral apex; three discal costae (and a weakly developed fourth one) slightly elevated, somewhat more shiny than the non-costal areas; a short accessory costa between bases of second and third costae; first and second discal costae rather closely set with elliptic umbilicate punctures in a single or double series, much smaller than the non-costal ones, most of them bearing a suberect seta; third and fourth costae, and external border of sutural one, with round, simple and still finer setigerous punctures; non-costal areas with dense, elliptic, horseshoe-shaped punctures, or, in apical declivity, more round and umbilicate; horseshoes bordering costae mostly seriate, for the rest only locally subseriate; many non-costal punctures with an extremely short, fine and reclined seta on core of horseshoes, only visible under high magnification; between the non-costal horseshoes a very sparse setosity, more abundant laterally and apically, arising from small, subcircular punctures; elytral margins, seen from above, only serrulate anteriorly; margins bordered by a rather narrow, sharp-topped carena, gradually more round-topped in posterior direction, fading out shortly before elytral apex; external part of this carena with a rather scanty fringe of setae, long anteriorly, but strongly, more gently apically, decreasing in length and diameter towards apex; sutural angle with a fine denticle.

Pygidium: Margins bordered by a very fine, sharp ridge, apically obsolete, bearing a fringe of short setae, increasingly long towards apex; disc with fine, variably long setae, arising from dense, round, often somewhat transverse punctures of variable size.

Fore tibia: Denticles of inferior longitudinal series at strongly increasing distances from base to apex; basal accessory denticles directed backward.

Middle and hind tibiae: No median, transverse, setigerous ridge.

Variation of ♂: Length up to 12.9 mm; setosity on elytral costae may be complete; lateral margins of pronotum slightly sinuate before postero-lateral angles; ♀: lengths balancing at about 13 mm; anterior half of pronotal margins may converge more than in ♂; more confluence of punctigerous depressions on pronotum may occur; in discal area of elytra the intercostal setae may be more abundant, the setigerous punctures slightly shiny, contrasting with the surrounding mat surface.

### ***Phaeochroops indicus* Arrow**

(figs. 37-41)

*Phaeochroops indicus* Arrow, 1907: 359 (diagnosis; type-loc. Nilgiri Hills, S. India).

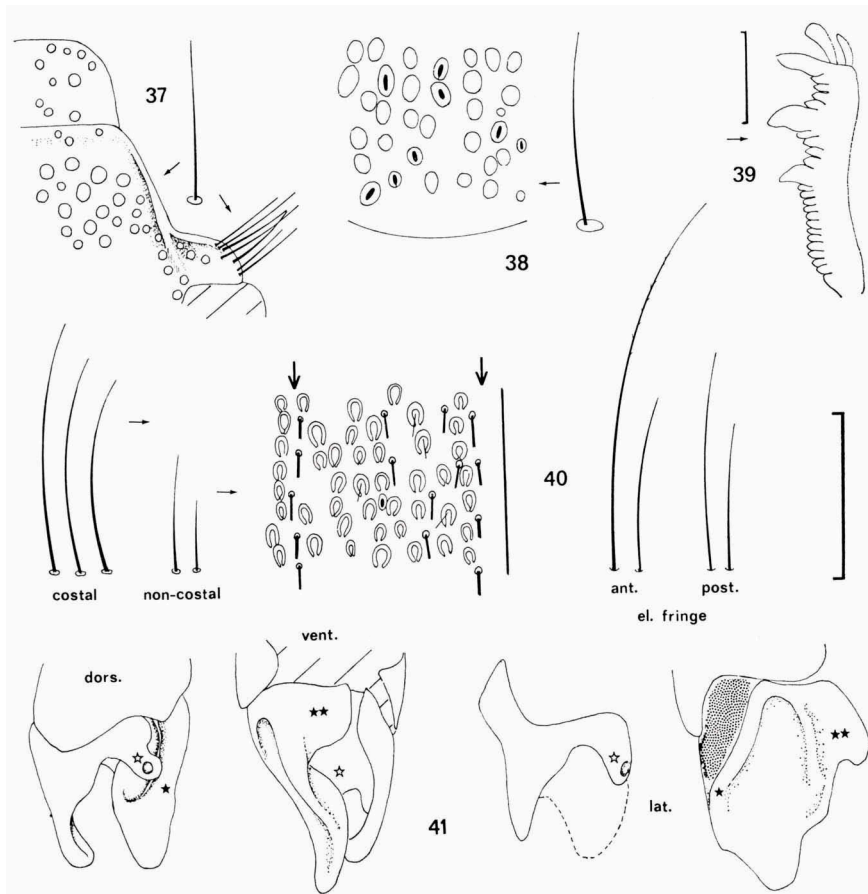
*Phaeochroops indicus* Arrow, 1942: 927 (key).

Diagnosis. — Right paramere subtriangular in lateral view, with a transparent area on upper part and a shallow excavation on lateral surface; elytral fringe without interruptions; elytral setae arising from small, round punctures; middle tibia and, in a lesser degree, hind tibia, with a transverse median ridge on external surface; no accessory costa; elytral setosity distributed over costae and non-costal surface; costal setae distinctly seriate; many elytral setae microscopically plumose ( $\times 100$ ).

Redescription of the type series, three ♀. — The lectotype being rubbed off, I included information based on the two paralectotypes in the description. Blackish brown, setae yellowish red; length of lectotype  $1.7 + 3.0 + 7.4 = 12.1$  mm.

Labrum: Anterior margin straight, lateral margins straight and somewhat converging in anterior direction; disc with some coarse, setigerous punctures, evenly distributed over its surface.

Clypeus and rest of head: Anterior margin nearly straight, lateral margins nearly straight, convergent towards anterior margin; the elevation, bordering anterior margin in most species, hardly present; lateral margins partially bordered by a narrow, rather sharp-topped elevation, bifurcate at base of eye-canthus, one branch continued over some distance along anterior margin of eye-canthus, the other one, weakly developed, prolonged towards inner



Figs. 37-41. *Phaeochroops indicus* Arrow, paralectotype ♀. 37, Labrum and clypeus with setosity; 38, punctation and discal setosity of pronotum; 39, left fore tibia; 40, punctation, discal (costal and non-costal) and fringal setosity of elytra; 41, parameres of Coimbatore ♂; grey area transparent. Scale lines represent approximately 1 mm.

margin of eye; surface shiny, set with coarse round punctures of varying diameters, the smallest on vertex, most situated at bottom of an ill-defined, shallow depression; many punctures with a long, erect seta; eye-canthus with a dense tuft of about 15 erect setae, of about the same size as the discal ones.

Pronotum: Anterior margin, seen from above, straight, but concave before the acute antero-lateral angles, lateral margins slightly curved and converging from base to anterior margin of pronotum, posterior margin bisinuate; anterior margin bordered by a hardly developed elevation, more distinct before antero-lateral angles, and continued along lateral margins as a rather

sharp carena, which slightly and gradually widens towards postero-lateral angles; posterior margin bordered by a narrow band, impunctate except for some minute, setigerous punctures; surface shiny, set with often subumbilicate, elliptic or, laterally, round punctures; each puncture situated at bottom of an ill-defined, shallow depression, the depressions sometimes confluent in short longitudinal series; diameters of punctures gradually decreasing towards lateral and posterior margins of pronotum; most punctures with a long, erect seta; some lateral punctures with a very short and fine, recumbent seta, length approximately equal to diameter of puncture; lateral margins serrulate, fringed with erect setae of about same length as central discal ones, setae rather dense, still denser on subrectangular postero-lateral angles.

Elytra: Sutural costa convex, smooth, slightly widening towards apex, sutural angle with denticle; first discal costa weakly, second and third ones hardly or not elevated, only indicated, and often poorly so, by the bordering regular series of punctures; non-costal surface shiny, densely set with round horseshoe-shaped punctures, less dense, still more round and often umbilicate on lateral and apical declivities; punctures irregularly distributed, except along borders of costae, where they are regularly seriate; locally traces of ill-defined secondary costae occur, formed by subseriate punctures; many horseshoes with an extremely fine, recumbent seta; whole elytral surface, costae included, provided with setae of considerably varying length, distinctly seriate on discal costae and along external margin of sutural costa, scatteredly or subseriately distributed everywhere else; setae arising from round or elliptic punctures of slightly varying diameters, but much smaller than the horseshoes; setae often microscopically plumose; elytral margins anteriorly weakly serrulate, simple in posterior part; margin bordered by a narrow ridge, somewhat sharp-topped anteriorly, slightly and gradually widening and more round-topped posteriorly; external part of this ridge with a rather dense fringe of mixed long and shorter setae, slightly decreasing in length in posterior direction, but increasing again before apex; no trace of an accessory costa between bases of second and third discal costae.

Pygidium: Surface shiny, with a dense punctation, much finer than elytral punctation; each puncture with a slightly reclining, fine seta, much shorter than elytral setosity; margins densely fringed.

Fore tibia: Basal accessory denticles directed laterad or slightly forward.

Middle and hind tibiae: A median, transverse carena, densely set with strong, spine-like, relatively short setae on external surface.

Variation of the non-type specimens, ♂ and ♀: length 10.6-12.4 mm; apart from the usual slight variability in punctation and setosity, only the



occasional absence of the fine setigerous punctures along posterior border of pronotum may be mentioned.

Type material. — Lectotype ♀, here designated, with labels "Type", print, red ring; "430", red, handwritten; "Nilgiri Hills, H. L. Andrewes, 1907-4", print; "*Phaeochroops indicus* Arrow, type 1907", Arrow's hand; paralectotype ♀, here designated, labelled "Nilgiri Hills, H. L. Andrewes", print; "Andrewes Bequest BM 1922-221", print; "Nilgiri Hills", print; "*Phaeochroops indicus* Arrow cotype", Arrow's hand; paralectotype ♀, here designated, labelled "430", handwritten; "Anamalais", print; "*Phaeochroops indicus* Arrow cotype", in Arrow's hand; the three specimens are in London, and are additionally labelled with a syntype label in blue ring, Bacchus's name and syntype labels and my (para)lectotype labels.

Material examined. — Apart from the type specimens, I studied 1 ♂, 2 ♀ (coll. Hardy, Leiden) from the Anamalai Hills, S. India; 1 ♀ (coll. Hardy) from Kerala State, S. India; 1 ♂ from Coimbatore, S. India (coll. Kuijten). The labels indicate altitudes from 3500-4200 feet, so *P. indicus* may well be a mountain species.

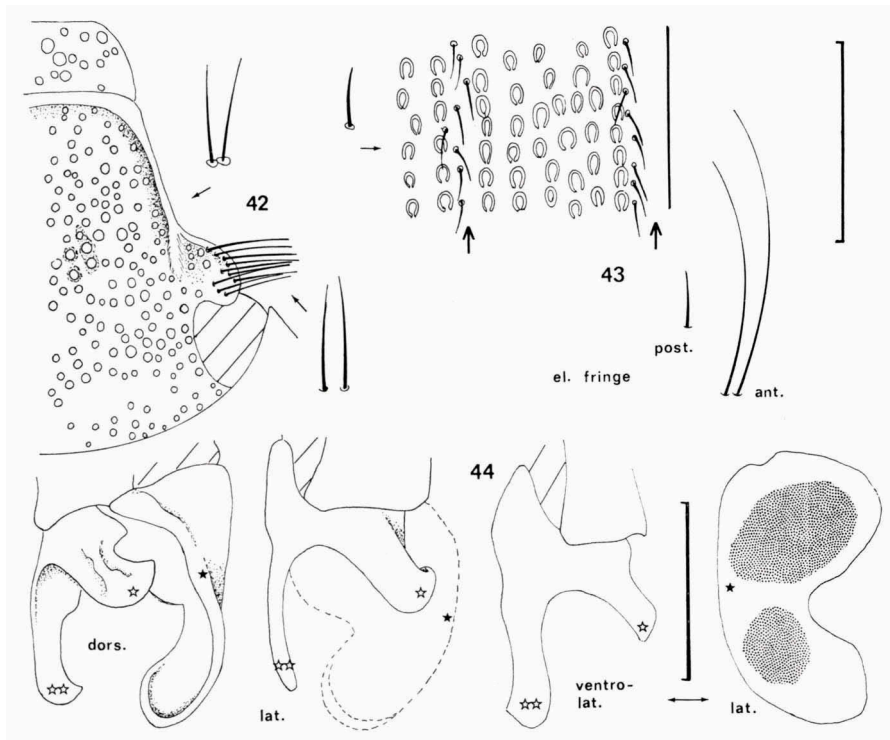
***Phaeochroops lakhonicus* sp. nov.**  
(figs. 42-44)

Diagnosis. — Right paramere in lateral view with strongly bent downward apical half, interior surface of extreme apex simple; elytral fringe not interrupted; elytral setosity arising from small, round punctures; middle tibia with a well developed transverse, median carena, a less developed one in hind tibia; no accessory costa between bases of second and third elytral costae; elytral setosity restricted to median series on discal costae and a series on external margin of sutural costa.

Note. — *P. lakhonicus* is rather similar to *P. laotianus*, *opacicollis* and especially *ninbin*. The paucity of the material of some of these forms precludes a conclusion on their exact taxonomic status. Considering the differences in elytral setosity, so characteristic in many species, I prefer to treat them as species, until more material has become available.

Description. — Identical in most characters, apart from the usual slight variability in punctuation, setosity etc., with *P. ninbin* (p. 45); consequently, the description of the five available specimens may be restricted to an account of the pertinent differences with that species. Length of holotype  $1.5 + 3.3 + 8.2 = 13.0$  mm, of paratypes 12.4-12.8 mm.

Pronotum: Setae of fringe generally longer than discal ones, somewhat decreasing in length towards the rather rounded, postero-lateral angles.



Figs. 42-44. *Phaeochroops lakhonicus* Kuijten, holotype ♂. 42, Head with setosity; 43, punctuation, discal and fringed setosity of elytra; 44, parameres; grey areas transparent. Scale lines represent approximately 1 mm.

**Elytra:** Setosity concentrated on costae, anteriorly irregularly seriate; discal costae hardly elevated; well developed "secondary costae" may be observed in parts of elytral disc (= narrow, longitudinal, punctureless bands, bordered by more or less regularly seriate horseshoes), along the normal costae.

**Middle and hind tibiae:** A medial, transverse ridge on external surface of tibiae is present, well developed in middle tibia, somewhat less in hind one.

**Genitalia:** Compare figs. 44 and 64.

**Type material.** — Holotype and 4 paratypes, all ♂ (Paris, Leiden), labelled "Museum Paris, Lakhon, Harmand 1878", print; "145 78", handwritten; "Mt Lakhon, Harmand", handwritten, in one paratype only; my identification and type labels.

**Material examined.** — Apart from the type series no material known.

**Note.** — I could not trace the exact locality of capture: there is a Lakhon, S.E. of Lamphun in N. Thailand (named West Laos in old atlases), and

a Lakhon at the Thai bank of the Mekong, in N.E. Thailand, approximately west of the vietnamese Quang Tri.

Derivation of name. — From Lakhon, the type locality.

**Phaeochroops lansbergei** Candèze  
(figs. 45-50)

*Phaeochroops lansbergei* Candèze, 1876: 64 (diagnosis; type-loc. Buitenzorg, Java).

*Phaeochroops lansbergei* Candèze; de Borre, 1886: 62 (discussion of taxonomic place of the species).

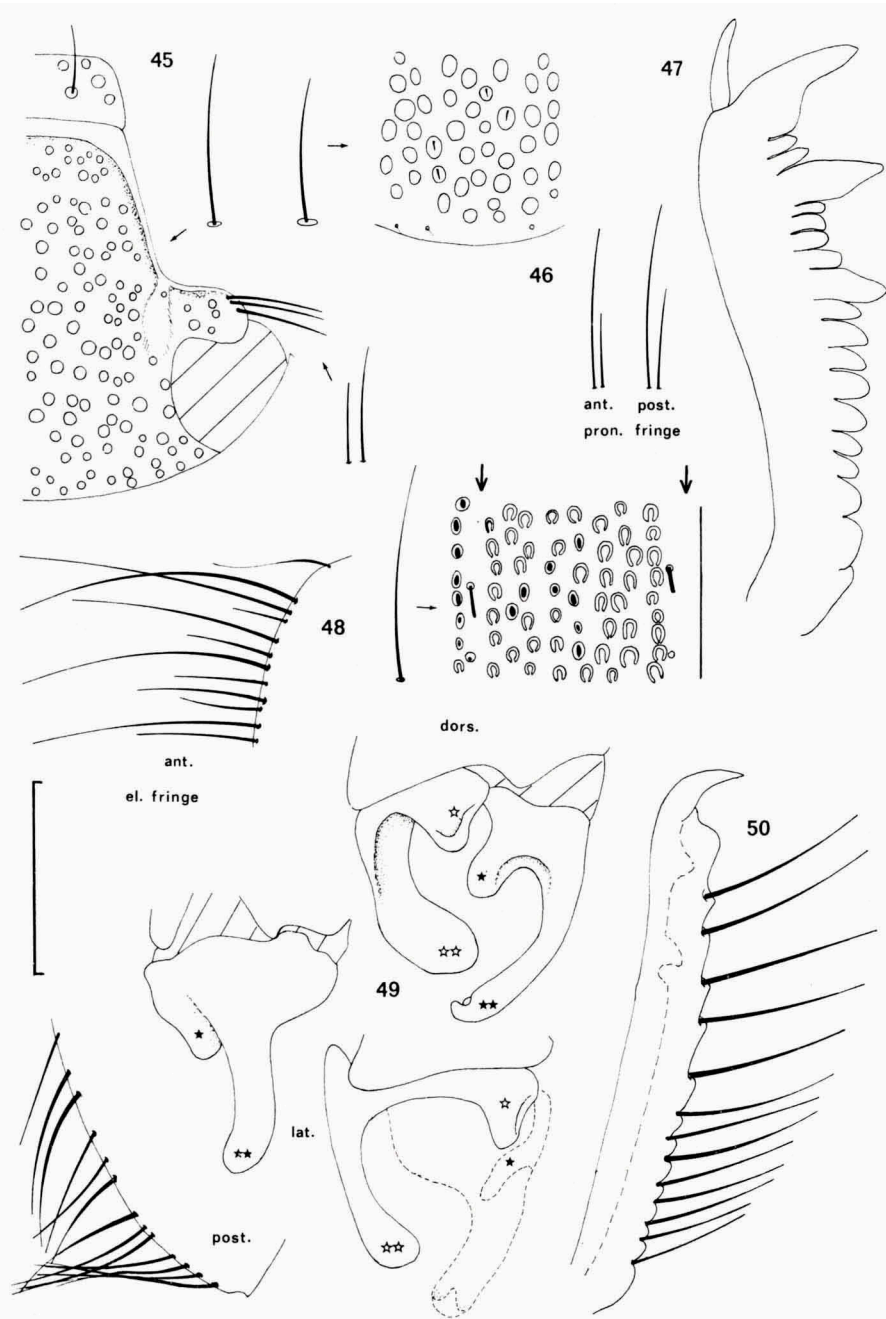
Diagnosis. — Right paramere, in lateral view, with a long and slender lobe, apex of lobe bent inward and somewhat dentiform; elytral fringe without interruptions; length of fringal setae gradually decreasing towards elytral apex; elytral setosity arising from small, round punctures; no transverse carena in middle and hind tibiae; no accessory costa between bases of second and third discal costae; elytral setosity distributed over costae and non-costal surfaces.

Redescription of ♂ holotype. — Dark reddish brown, setae yellowish red (elytra with some asymmetric black spots, probably caused by inadequate handling after capture). Length  $2.3 + 3.0 + 7.3 = 12.6$  mm.

Labrum: Anterior margin straight, lateral margins faintly convex, converging towards anterior margin; disc shiny, with 12 shallow, round punctures, mainly arranged along margins, all with a variably long, forward directed seta.

Clypeus and rest of head: Anterior margin straight, lateral margins straight and converging towards anterior margin; anterior margin bordered by a wide, flat, weakly elevated band, continued along lateral margins as a narrow, higher, somewhat sharp-topped ridge; the ridge bifurcate at base of eye-canthus, one branch continued along anterior margin of eye-canthus, but obsolete before apex, the other one, wider, flatter, more round-topped and poorly delimited, nearly reaching inner margin of eye; derm shiny, set with round punctures, each of which at bottom of an ill-defined, shallow depression, punctures deep and large on frontal, shallower and finer on clypeal surface, but everywhere varying in diameter and depth; many punctures with a rather long, erect seta; eye-canthus with a tuft of about ten erect setae of variable lengths, shorter than discal ones.

Pronotum: Anterior margin, seen from above, straight in middle, concave before the acute antero-lateral angles; lateral margins evenly and weakly rounded, subparallel in posterior half, somewhat converging anteriorly, nearly indistinctly concave before antero-lateral angles; posterior margin shal-



Figs. 45-50. *Phaeochroops lansbergei* Candèze, holotype ♂. 45, Head with setosity; 46, punctuation, discal and fringal setosity of pronotum; 47, right fore tibia; 48, punctuation, discal and fringal setosity of elytra (anterior and posterior parts of elytron full-drawn); 49, parameres; 50, lateral aspect of fore tibia with ventral, denticulate carena, setae at approximately real, relative, size. Scale line represents approximately 1 mm.

lowly bisinuate; anterior margin bordered by a flat, weakly elevated band, slightly narrowing towards antero-lateral angles, continued along lateral margins as a rather sharp-topped ridge, slightly and gradually widening and more elevated towards the slightly obtuse, postero-lateral angles; posterior margin bordered by a narrow, faintly elevated band, smooth except for a few extremely fine, setigerous punctures; lateral margin serrulate, fringed with dense setae, slightly curved backward, of various, mixed, lengths, but generally somewhat longer posteriorly, still denser before and on postero-lateral angles; derm shiny, rather closely set with round to elliptic, deep punctures, slightly less deep on basal and lateral areas, mostly situated at bottom of an ill-defined, shallow depression; on pronotal disc the depressions show a tendency to forming short, longitudinal, coalescent series; many punctures with a long, erect seta; many other punctures with an extremely fine, reclined seta, hardly as long as diameter of puncture, only visible under high magnification and a certain angle of illumination.

Elytra: Sutural costa somewhat elevated, round-topped, smooth, slightly and gradually more elevated towards apex; first and second discal costae slightly elevated, smooth, the third one only recognizable as a narrow, impunctate band, delimited, as all costae, by a sublinear series of punctures; accessory costa absent; non-costal surface shiny, rather closely set with horseshoe-shaped to umbilicate punctures of varying diameters, many rather shallow, and situated at bottom of an ill-defined, shallow depression; the depressions showing a slight tendency to confluence; many horseshoes and umbilicate punctures on lateral and apical declivities with an extremely fine, recumbent seta; external border of sutural costa and centre of discal costae with a series of widely separated setae, arising from round punctures, much smaller than the horseshoes; non-costal surface with very sparse setae on disc, somewhat more abundant on lateral and apical declivities, arising from small, round punctures; all setae long, erect or slightly curved backward; elytral margins smooth, bordered by a narrow, sharp-topped elevation, slightly widening and more round-topped in posterior direction; external part of the elevation with a fringe of mixed very long and much shorter setae, somewhat directed backward, and in general decreasing in size towards apex; sutural angle with a denticle.

Pygidium: disc shiny, closely set with fine punctures, most with a fine, reclining seta of about the same length as in apical part of elytral fringe; margins fringed with a slightly longer and denser setosity.

Fore tibia: Basal accessory denticles partly directed backward.

Middle and hind tibiae: No median, transverse, setigerous carena developed.

Variation of ♂ and ♀: Lengths ♂ from 10.3-13.3 mm, lengths ♀ from 10.5-14.3 mm; apart from the normal, unnoticeable variability in relative length of setosity, density, deepness, diameter of punctures, elevation of costae etc., nearly all fronto-clypeal punctures may bear a seta, the elytral non-costal setosity may be more abundant and more or less homogeneously distributed, the microsetosity may occupy parts of elytral disc and the sutural apical denticle may be absent; the depth of the incision between superior and inferior lobe of right paramere is slightly variable as are the form of the superior lobe and of the apical denticle of inferior lobe.

Type material. — Holotype ♂ (Brussels) by monotypy, as may be derived from Candèze's description, labelled "Holotype", red, print; "Coll. R.I.Sc. N.B., Java, ex coll. Candèze", yellow, print; "n. sp. *Lansbergei* Cdz, Java" hand.

Material examined. — Apart from the holotype I studied 24 specimens, ♂ and ♀, (Amsterdam, Budapest, Dresden, coll. Kuijten, Leiden, Paris, Wageningen) from Java, the localities being distributed mainly over the mountainous parts of the island (Idjen, Moeria, Tengger, Gede, Kawi and other volcanoes).

Note. — The above-mentioned variability in length, external and genital characters may eventually be correlated with the localities and give arguments for splitting *P. lansbergei* into subspecies. For the moment the numbers per locality are too small for conclusions in this respect.

### ***Phaeochroops laotianus* Paulian** (figs. 51-55)

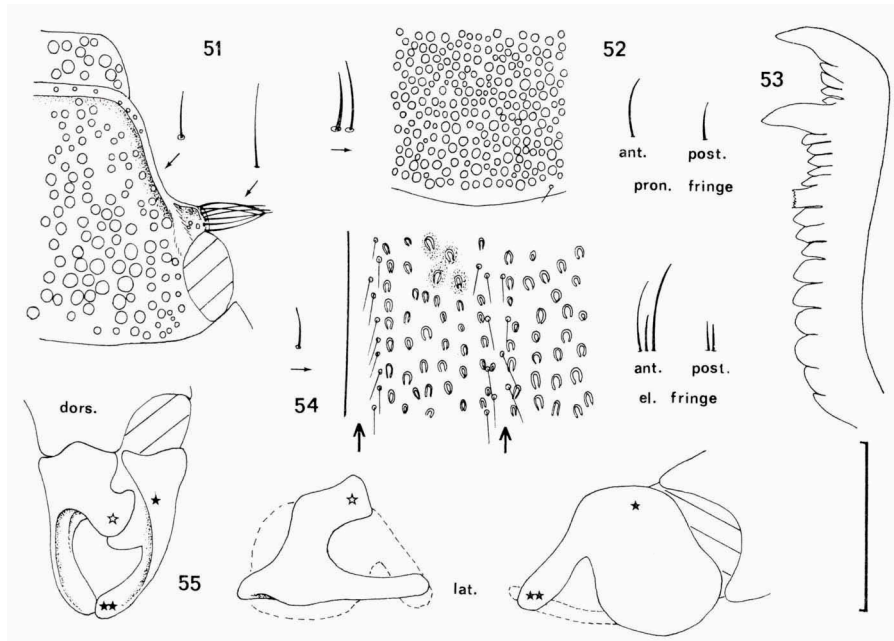
*Phaeochroops laotianus* Paulian, 1945: 36 (diagnosis; type-loc. Nam Tien, Laos).

Diagnosis. — Right paramere with a slender, downward, apical protrusion with a simply rounded apex; elytral fringe not interrupted, setae of fringe gradually shortening towards apex of elytron; no transverse ridges in middle and hind tibiae; no accessory costa; elytral setosity restricted to costae, mostly considerably shorter than setosity of fringe.

Redescription of ♂ holotype. — Dark blackish brown, setosity yellowish red; length  $1.3 + 2.4 + 6.9 = 10.6$  mm.

Labrum: Anterior margin straight, lateral margins slightly curved, converging towards anterior margin; disc shiny, with about 22, rather ill-defined, setigerous punctures of varying diameters, distributed over whole surface.

Clypeus and rest of head: Anterior margin straight, lateral margins nearly straight, convergent towards anterior margin; anterior margin bordered by



Figs. 51-55. *Phaeochroops laotianus* Paulian, holotype ♂. 51, Head with setosity; 52, punctation, discal and fringal setosity of pronotum; 53, left fore tibia; 54, punctation, discal and fringal setosity of elytra; 55, parameres. Scale line represents approximately 1 mm.

a flat and low, sparsely and minutely punctate elevation, continued along lateral margins as a more elevated, sharper and narrower ridge; the ridge bifurcate at base of eye-canthus, one branch continued along anterior margin of eye-canthus, the other one, flatter, more round-topped and poorly delimited, reaching inner margin of eye; surface densely set with subcircular punctures of varying diameters, coarse on front, finer and less deep on clypeus and along eyes; each puncture situated at bottom of a shallow, ill-defined depression, in medial part of head the depressions partly confluent; most punctures with an erect, somewhat curved seta; eye-canthus strongly depressed, with a tuft of about 10 erect setae, some of which are much longer than the discal setosity.

Pronotum: Anterior margin, seen from above, straight in middle, concave before acute antero-lateral angles, sides straight, convergent towards anterior margin, posterior margin weakly bisinuate; anterior margin bordered by a narrow, smooth band, continued along lateral margins as an elevated ridge; the ridge narrow and sharp-topped in anterior one-fourth, strongly and gradually widening and more round-topped towards the rectangular, apically rounded, postero-lateral angles; posterior margin bordered by a narrow band,

smooth except for some extremely fine, setigerous punctures; derm very closely set with subcircular punctures, deep and rather wide discally, less deep and finer along margins, each one situated at bottom of an ill-defined, shallow depression; the depressions often contiguous and partly confluent, mainly in more or less longitudinal direction; most punctures with a long, slightly reclining seta; lateral margins weakly serrulate, fringed with erect setae, anteriorly about equally long as discal setosity, in posterior two-thirds the setae gradually decreasing in length and density, and more reclined backward.

Elytra: Sutural costa smooth, round-topped, faintly widening towards apex, sutural angle with denticle; first discal costa very weakly elevated, second and third ones only discernible as shiny, punctureless bands; all discal costae obsolescent towards apical declivity; no accessory costa between bases of second and third discal costae; non-costal areas shiny, set with rather small and widely separated horseshoes and, locally, umbilicate punctures, each one situated at bottom of a shallow, ill-defined depression (some indicated by fine dotting in fig. 54), locally subseriate, and regularly seriate on borders of costae; elytral setosity arising from round or horseshoe-shaped punctures, much smaller than the non-setigerous horseshoes; except for an area along elytral base and on apical declivity, where the setae occupy non-costal surface, setosity restricted to more or less uniseriate, regular rows of rather short, somewhat recumbent setae along external margin of sutural costa and both margins of discal costae; lateral margin bordered by a narrow, somewhat sharp-topped carena in anterior third; the carena gradually and considerably widening and more round-topped towards apex; external part of this carena densely fringed with laterad or backward directed setae, anteriorly generally much longer than discal ones, gradually decreasing in length in anterior one-third, but remaining equally short over posterior two-thirds of margin.

Pygidium: Derm glossy, densely set with small, round punctures, most bearing a strongly reclined seta, much longer than the elytral ones; margins fringed with still longer setae.

Fore tibia: Basal accessory denticles coarse, blunt, protruding in lateral direction.

Middle and hind tibiae: In both pairs traces of a median, transverse carena are present.

Type material. — Holotype ♂ (Paris) with labels "Laos, Nam Tien, 1e 14.iv.1918, R. Vitalis de Salvaza", print and hand combined; "*Phaeochroops* sp. E. Benderitter det."; "*Phaeochroops laotianus* n. sp. R. Paulian det."; "Type", red, print.

Material examined. — Only the holotype is known.



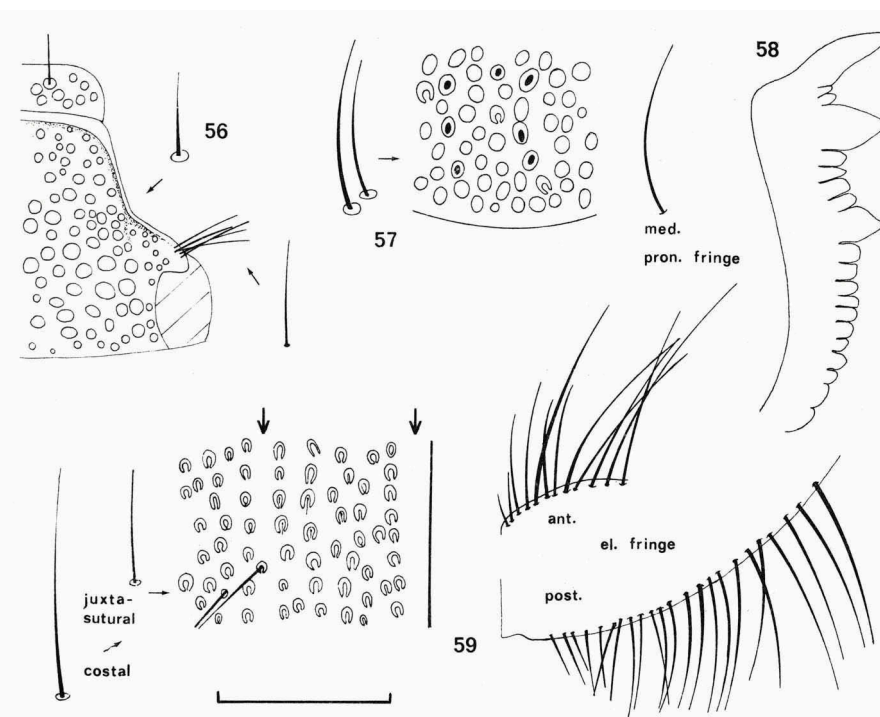
***Phaeochroops longisetosus* sp. nov.**

(figs. 56-59, pl. 3)

**Diagnosis.** — Elytral fringe without interruptions; elytral setosity mainly arising from small, round punctures, some setae from small horseshoes; middle and hind tibiae with a strong, median, transverse ridge on external surface; no accessory costa near base of second discal costa on elytra; very long setae in elytra both on costae and non-costal surfaces; setae sparsely and evenly distributed over whole elytron, no seriation on or along costae.

**Description of holotype ♀.** — Dark brown, margins and legs somewhat reddish, setae reddish yellow; length  $1.0 + 2.2 + 6.0 = 9.2$  mm.

**Labrum:** Anterior margin approximately straight, lateral margins slightly convex, converging towards anterior margin; disc with about 18 shallow, partly confluent, round punctures, each with a seta, reclined in anterior direction.



Figs. 56-59. *Phaeochroops longisetosus* Kuijten, holotype ♀. 56, Head with setosity; 57, punctation, discal and fringal setosity of pronotum; 58, right fore tibia; 59, punctation, discal (juxta-sutural and costal) and fringal setosity of elytra (anterior and posterior parts of elytron full-drawn). Scale line represents approximately 1 mm.

Clypeus and rest of head: Anterior margin faintly convex, lateral margins straight, converging towards anterior margin; anterior margin bordered by a low and flat elevation, continued along lateral margins as a much narrower and somewhat higher ridge, ending before apex of eye-canthus; derm shiny, though less so than on pronotal disc, closely set with subcircular punctures of strongly varying diameters, partly situated at bottom of a shallow, weakly defined depression; some punctures with a long erect seta; eye-canthus with a tuft of 5-6 long erect setae.

Pronotum: Anterior margin, seen from above, weakly bisinuate, antero-lateral angles acute, lateral margins slightly but distinctly convex, convergent towards anterior margin; posterior margin bisinuate; anterior margin bordered by a flat, impunctate, slightly elevated band; lateral margins strongly serrulate and, in posterior three-fourths, bordered by a ridge, rather low and sharp-topped in its anterior part, somewhat higher, wider and more round-topped posteriorly, and occupying also the subrectangular postero-lateral angles; posterior margin bordered by a narrow band, which is smooth except for a few extremely fine punctures, each bearing a minute seta; surface shiny, closely set with deep, elliptic or round, often umbilicate punctures, laterally partly horseshoe-shaped; diameters of punctures varying, mostly large on disc, much smaller in anterior and lateral parts; each puncture at bottom of an ill-defined, shallow depression, partly subseriate longitudinally; many punctures with a very long, erect seta; marginal ridge with a rather thin fringe of outward setae, increasing in length in anterior two-thirds, rapidly decreasing towards postero-lateral angle; setae of fringe generally very long, the longest ones, in middle of margin, approximately one-third of width of pronotum.

Elytra: Sutural costa smooth, round-topped, slightly and gradually widening and more elevated towards apex, sutural angle with a minute denticle; first and second discal costae only discernible as smooth, longitudinal bands, delimited on both sides by a sublinear series of punctures, obsolete on apical declivity; no accessory costa near base of second discal costa; non-costal surface shiny, set with shallow, often subcircular, horseshoes, in lateral and apical declivities the punctures more umbilicate and circular; horseshoes distinctly uniseriate along borders of costae, the remaining ones arranged in two more or less regular rows on anterior half of elytral disc, but punctures irregularly distributed everywhere else; each elytron with about 30 widely separated, somewhat reclining, often microscopically plumose setae on costae and non-costal areas ( $\times 100$ ); most setae very long, but those along sutural costa about half as long as the discal ones; setae mostly arising from small, round punctures, exceptionally from a small horseshoe; many

horseshoes with an extremely short, recumbent seta, hardly longer than diameter of puncture; lateral margin serrulate, bordered by a very narrow, sharp-topped ridge, slightly wider and more round-topped towards apex; external part of this ridge with a thin fringe of outward and backward directed setae, partly still longer than discal ones anteriorly, gradually decreasing in length before apex, reaching only one-fourth of original length near extreme apex.

Pygidium: Shiny, closely set with fine punctures, most with a seta, much shorter than the elytral ones; a differentiated marginal fringe not present.

Fore tibia: Underside with a longitudinal series of only seven denticles, gradually more spaced from base to apex of tibia; basal accessory denticles rather blunt and outward directed.

Middle and hind tibiae: External surfaces with a strong, median, transverse carena, set with some thick, spine-like setae.

Abdominal sternites: Very shiny, with a sparse setosity, much finer and shorter than elytral setae.

Type material. — Holotype ♀ (Leiden) with labels "Coimbatore, S. India, x.1975"; "ex coll. P. Kuijten"; "Holotype"; identification label.

Material examined. — Only the holotype is known.

Derivation of name. — Lat. *longisetosus* = with long hairs.

***Phaeochroops ninbin* sp. nov.**  
(figs. 60-65)

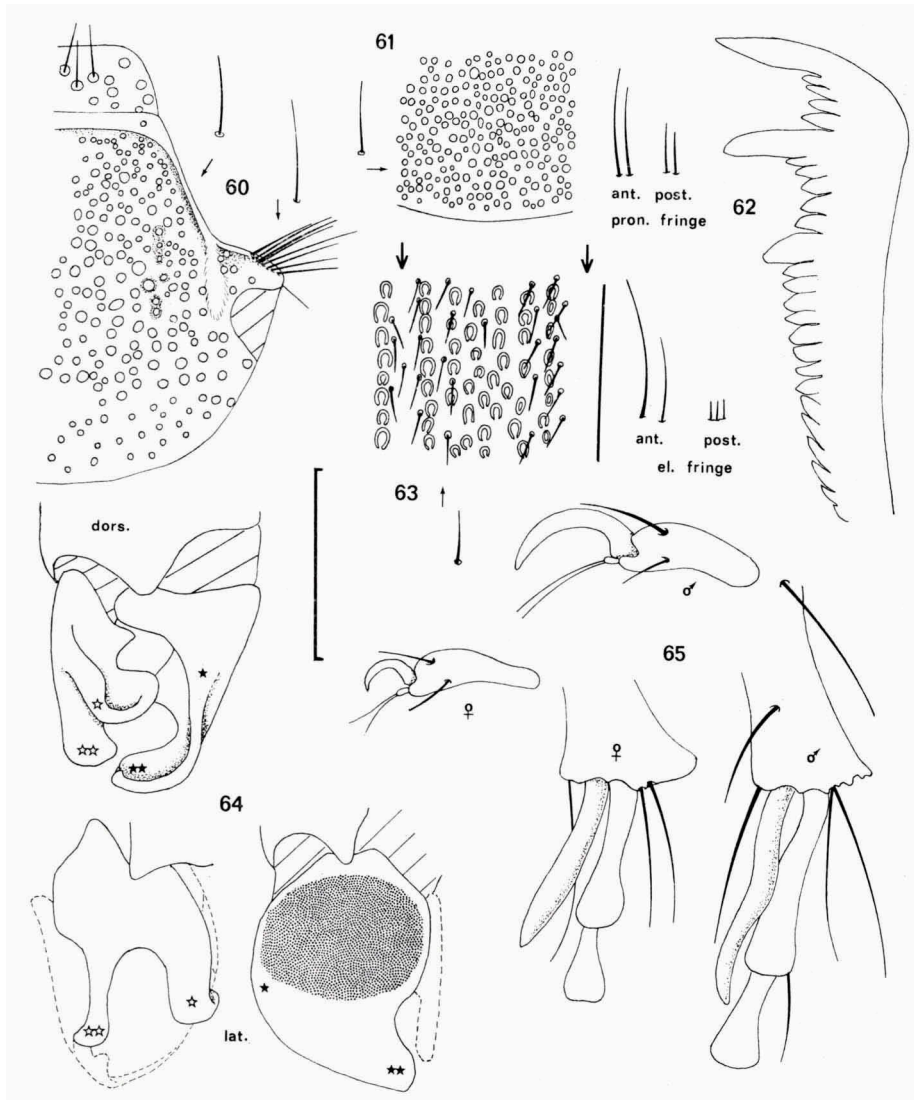
Diagnosis. — Apex of inferior lobe of left paramere with an inward protrusion, right paramere, in lateral view, with a short and broad terminal protrusion, its apex curved inward and bluntly toothed; fringe of elytra not interrupted; elytral setae arising from small, round punctures; external surface of middle tibia without, of hind tibia with a median transverse ridge; no accessory costa between bases of second and third discal costae in elytra; non-costal surface shiny; setosity in elytra restricted to non-costal areas, at most locally subseriate along costae, for the rest irregularly distributed.

Description of holotype ♂. — Dark brown; setosity reddish brown; length  $1.4 + 3.0 + 7.5 = 11.9$  mm.

Labrum: Anterior margin straight, lateral margins weakly convex, somewhat convergent towards anterior margin; disc with about 30 subcircular, variably deep, setigerous punctures, distributed over whole surface.

Clypeus and rest of head: Anterior margin straight, lateral margins straight, converging toward anterior margin; anterior margin bordered by a flat, wide, slightly elevated band, continued along lateral margins as a

narrow, somewhat higher ridge, prolonged along anterior margin of eye-canthus, with a vestigial, smooth and weakly elevated branch from base of eye-canthus to inner margin of eye; surface shiny, closely set with deep,



Figs. 60-65. *Phaeochroops ninbin* Kuijten, holotype ♂. 60, Head with setosity; 61, punctation, discal and fringal setosity of pronotum; 62, left fore tibia; 63, punctation, discal and fringal setosity of elytra; 64, parameres of paratype; grey area transparant; 65, sexual difference (♀ : paratype) in claws of fore tarsi and apical spurs of hind tibia.

Scale line represents approximately 1 mm.

round punctures of varying diameters, in general the small and less deep ones concentrated along margins, especially those on vertex fine and shallow; most punctures at bottom of a shallow depression (in fig. 60 some indicated by fine dotting), only slightly wider than the punctures themselves, partly coalescent and forming short, longitudinal to more or less diagonal series; vertex with a small, poorly delimited, impunctate area; most punctures with an erect or recumbent seta; eye-canthus with a tuft of about ten erect setae, some of which are slightly longer than the discal ones.

Pronotum: Anterior margin, seen from above, slightly bisinuate, strongly concave before the sharp antero-lateral angles; lateral margins weakly convex, subparallel in posterior half, distinctly converging towards anterior margin in anterior half, posterior margin bisinuate; anterior margin bordered by a narrow, weakly elevated, smooth band, somewhat stronger before antero-lateral angles; continued as a narrow, sharp-topped ridge along first one-third of lateral margin, strongly widening, higher and round-topped in posterior two-thirds; posterior margin bordered by a very narrow band, impunctate except for a scanty row of minute, setigerous punctures along extreme posterior margin; derm shiny, extremely closely set with sub-circular to elliptic punctures of somewhat varying diameters, each one at bottom of an ill-defined depression; the depressions only slightly wider than the punctures and often forming short, more or less longitudinal, coalescent series; many punctures with an erect seta; lateral margins serrulate and fringed with erect or inward directed setae, considerably shorter towards postero-lateral angles, which are subrectangular, but strongly rounded off apically.

Elytra: Sutural costa round-topped, slightly higher and wider towards apex, which bears a denticle; first and second discal costae somewhat elevated, the third one only distinguishable as an impunctate band, all three obsolete on apical declivity; no accessory costa between bases of second and third costae; non-costal surface shiny, set with horseshoe-shaped punctures, more circular and umbilicate in apical area; in general the horseshoes irregularly distributed, but those along costae rather regularly seriate; along a costa-bordering series another more or less regular short series may occur locally, thus forming poorly developed "secondary costae"; non-costal surface with an irregularly distributed setosity, but locally showing a seriation along borders of costae; on disc hardly any seta on the costae; all setae arising from round punctures, much smaller than the horseshoes; lateral margin simple, bordered anteriorly by a narrow, sharp-topped ridge, hardly widening but more round-topped towards apex, obsolete before apex; external side of the ridge with an uninterrupted fringe of erect to reclined setae, long

anteriorly, gradually and strongly decreasing in length in posterior half and without increase in length before apex.

Pygidium: Disc densely covered with shallow, somewhat transverse, elliptical punctures, partly transversely coalescent over short distances; many punctures with a thin, recumbent seta, much longer than elytral discal setae; margins slightly thickened and densely fringed with still longer setae.

Fore tibia: Basal accessory denticles rather acute, the anterior ones directed outward, the posterior ones conspicuously directed forward.

Middle and hind tibiae: only in hind tibia a transverse, setigerous carena is present, at halfway total length of tibia.

Abdominal sternites: Rather closely covered with long, slender setae.

Variation of 2 ♂ paratypes: Lengths 11.4 and 11.6 mm; only the usual slight variations in density and other characters of punctation and setosity.

Variation of 9 ♀ paratypes: Lengths from 11.2 to 12.6 mm; apart from the usual basal variation, the setosity may be more or less homogeneously distributed over non-costal surface and is sometimes a shade shorter than in ♂; "secondary costae" may be distinctly developed.

Taxonomic status. — Considering the characteristic features of elytral setosity, parameres and other structures I prefer to give *P. ninbin*, preliminarily, specific status. A lowering to subspecific level may well be necessary as soon as more is known about distribution and variability of *P. lakhonicus*, *laotianus* and *opacicolis*.

Type material. — Holotype ♂ (Budapest) labelled "Vietnam: Cuc phuong, Ninh Binh, 11-17.v.1966, Gy. Topál Exped."; "nr 396 from under decaying carcass". Paratypes (Budapest, Leiden): 1 ♀ with same labels as holotype; 2 ♂, 8 ♀ from the same locality and month, but with various dates and sampling numbers. All specimens additionally labelled with my (para)type and identification labels.

Material examined. — Apart from the type series I saw one ♀ (Geneva) from Than Moi, Tonkin, that I tentatively include here.

Derivation of name. — A simplification of Ninh Binh, the type locality.

### ***Phaeochroops opacicolis* Arrow**

(figs. 66-70)

*Phaeochroops opacicolis* Arrow, 1909: 493 (diagnosis; type-loc. Plapoo, Tenasserim).

*Phaeochroops opacicolis* Arrow, 1942: 927 (key).

*Phaeochroops opacicolis* Arrow; Paulian, 1945: 37 (description; misidentification, see p. 63).

Diagnosis. — Terminal lobe of right paramere very broad in lateral view, its rather blunt apex curved inward and with a slightly undulate margin;

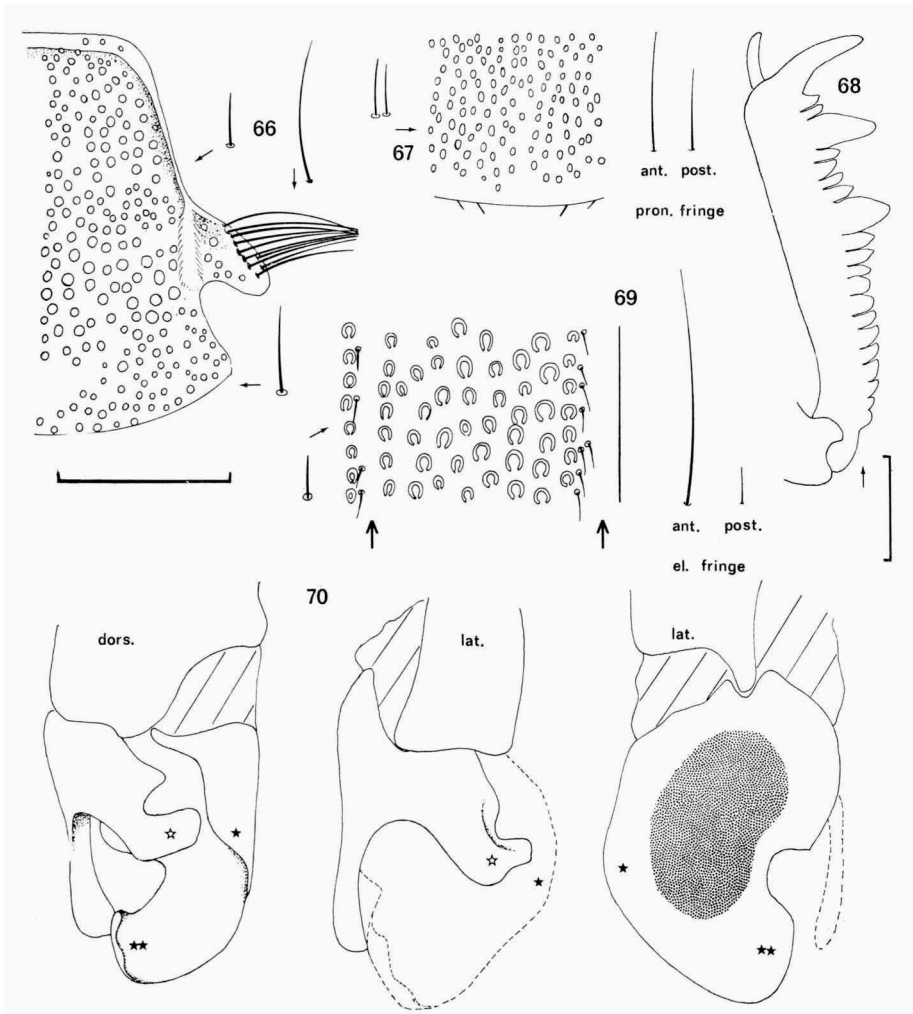
elytral fringe without interruptions; elytral setae arising from small, round punctures; external surface of middle and hind tibiae with a distinct, median, transverse, setigerous ridge; no accessory costa between bases of second and third discal costae; non-costal derm shiny; setosity on elytral disc restricted to costae.

Redescription of lectotype ♂. — Dark reddish brown, setosity yellowish brown; length  $2.1 + 4.0 + 10.0 = 16.1$  mm.

Labrum: Anterior margin straight, lateral margin approximately straight, convergent towards anterior margin, antero-lateral angles rounded; disc with 20 closely set, coarse, deep, setigerous punctures.

Clypeus and rest of head: Anterior and lateral margins straight, the latter converging in anterior direction; anterior margin bordered by a wide, flat, finely and scantily punctate, weakly elevated band, continued along lateral margins, but somewhat higher and much narrower here, obsolescent on anterior margin of eye-canthus; at base of eye-canthus a low, round-topped, smooth, poorly defined ridge branches off towards inner margin of eye; derm shiny, closely set with deep, round or elliptic punctures of varying diameters, the smaller punctures concentrated on vertex and along anterior margin, some interspersed among the larger discal punctation; the majority of the punctures, especially the larger ones, situated at bottom of a shallow, ill-defined depression; many punctures bearing a variably long seta; eye-canthus with a thick tuft of about 15 setae, much longer than the discal ones; middle of vertex with an impunctate area.

Pronotum: Anterior margin, seen from above, nearly straight, but concave shortly before the sharp antero-lateral angles; lateral margins serrulate, nearly straight, converging towards anterior margin; postero-lateral angles subrectangular, their apices rounded off, posterior margin bisinuate; anterior margin bordered by a smooth, medially not, laterally weakly elevated band, continued along lateral margins as a narrow, sharp-topped ridge in anterior one-third, gradually and strongly widening, more elevated and more round-topped in posterior two-thirds; posterior margin bordered by a narrow, darkened band, smooth except for a scanty series of very small punctures along extreme posterior rim, bearing minute, inward directed setae; derm set with fine, mostly suboblong punctures of varying diameters in disc, in general somewhat finer and shallower in marginal areas; though the derm is shiny, the punctures are so closely set, that the pronotum is mat to the naked eye; each puncture situated at bottom of an ill-defined, shallow depression; the depressions very closely set, sometimes confluent in short longitudinal series; many punctures bear a slightly reclining seta; lateral



Figs. 66-70. *Phaeochroops opacicollis* Arrow, lectotype ♂. 66, Head with setosity; 67, punctation, discal and fringal setosity of pronotum; 68, right fore tibia; 69, punctation, discal and fringal setosity of elytron; 70, parameres; grey area transparent. Scale lines represent approximately 1 mm.

margins fringed with long setae anteriorly, somewhat decreasing in length towards postero-lateral angles, but always longer than discal setae.

Elytra: Sutural costa very weakly elevated in anterior one-third, considerably higher over rest of length; three discal costae and faint traces of a fourth, lateral one, hardly elevated, obsolete on apical declivity, mainly defined by a more or less regular series of punctures, bordering costae on both sides; no accessory costa between bases of second and third discal ones;



derm shiny, intercostal areas with round horseshoes of varying diameters, lateral and apical areas with, in general, still more rounded, finer, umbilicate punctures, especially laterally less dense than on disc; except for the regular, costa-bordering series, punctation irregularly or weakly subseriately distributed; the short and fine, slightly recumbent to erect, elytral setae arising from very small, round punctures and, with a few exceptions, restricted to well defined, single series on external borders of costae; lateral margins bordered by a narrow, sharp-topped ridge, gradually lower and more round-topped in posterior direction, and obsolescent on extreme apex of elytron; external part of this ridge with a dense fringe of setae, generally long, but mixed with shorter ones, in anterior half, gradually and strongly decreasing in length and thickness from about middle of margin to apex of elytron; sutural angle with denticle.

Pygidium: Disc closely set with fine, round punctures, most bearing a slender seta, somewhat longer than elytral setae; margins fringed with fine, still longer setae.

Fore tibia: Basal accessory denticles rather acute, mainly protruding outward.

Middle and hind tibiae: In both pairs a transverse ridge is present on middle of external surface of tibia, set with some stout setae.

Variation: ♂ paralectotype, length 15.4 mm; posterior half of pronotal lateral margin weakly convex; ♀ paralectotype, length 15.0 mm; posterior one-third of lateral margin of pronotum weakly convex; discal costae somewhat more elevated; some setae present on top and along internal borders of costae. Both specimens with slight variations in density a.s.o. of punctation.

Type material. — Lectotype ♂, here designated (London), with labels "Syntype", print, in blue ring; "Tenasserim Plapoo Fea. Apr. 1887", print; "Genoa Mus. 1909-158", print; "*Phaeochroops opacicollis* Arrow co-type", in Arrow's hand; Bacchus's name and syntype label; my lectotype label. Paralectotype ♂, here designated (Genoa), labelled "Tenasserim Plapoo Fea. Apr. 1887", print; "Mus. Civ. Genova"; "23"; "cotypus", hand; identification label; my paralectotype label. Paralectotype ♀, here designated (Genoa), labelled "Tenasserim, Mt Mooleyit, 1000-1[?]00 m., Fea. Apr. 1887", print; "cotypus!", hand; "*opacicollis* Arrow", hand; "*Phaeochroops opacicollis* Arrow cotype", in Arrow's hand; "Mus. Civ. Genova", print; my paralectotype label.

Note. — Mooleyit = Mulai-yit Hill, 16°04'N 98°45'E, just inside Thailand, at Thai-Burma border.

Material examined. — Only the three type specimens known.

**Phaeochroops peninsularis** Arrow

(figs. 71-75)

*Phaeochroops peninsularis* Arrow, 1909: 492 (diagnosis; type loc. Malay Peninsula: Perak).

*Phaeochroops peninsularis* Arrow, 1942: 921 (key).

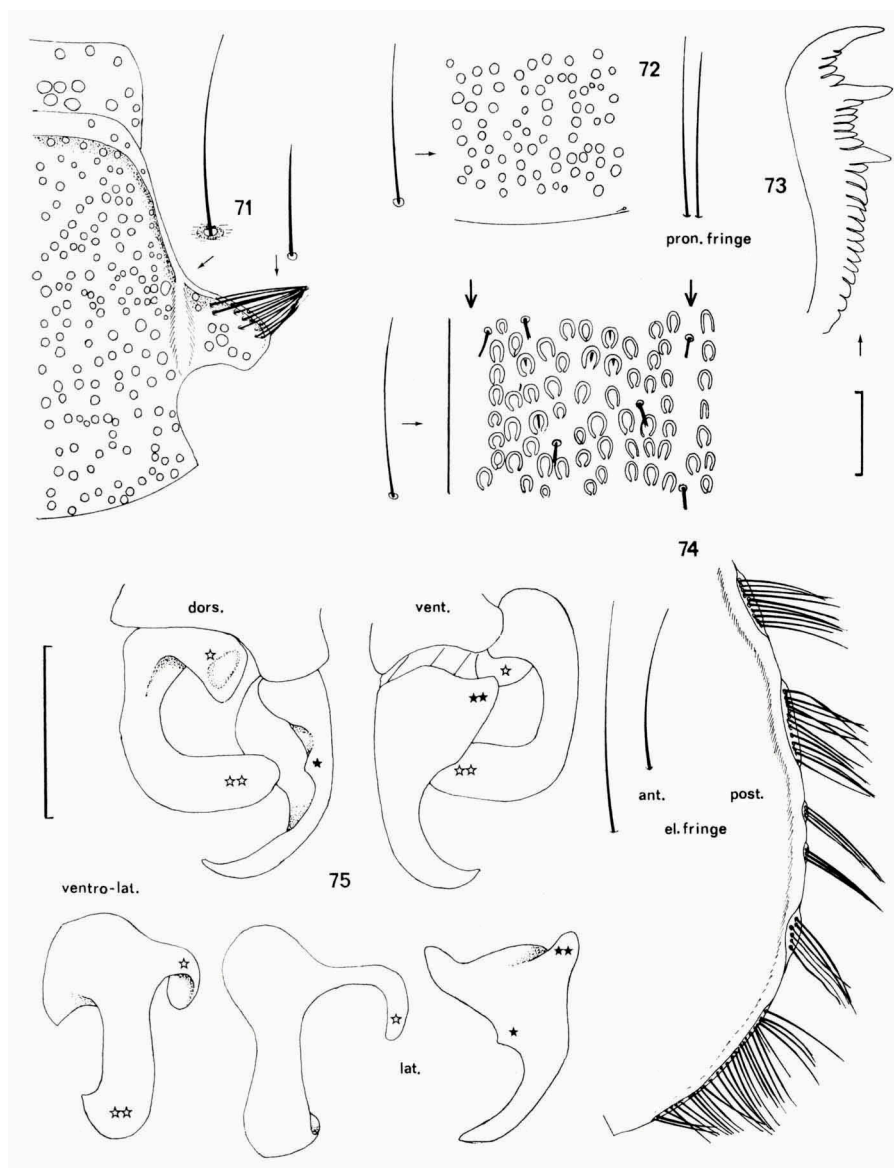
Diagnosis. — Right paramere with a long, sharp, slender apical protrusion; elytral fringe with up to ten conspicuous interruptions; all fringal setae long, showing only a weak decrease in length towards elytral apex.

Redescription of lectotype ♂. — Blackish brown, setosity ferrugineous; length  $1.8 + 3.3 + 9.5 = 14.6$  mm.

Labrum: Anterior margin straight, lateral margins straight and subparallel; disc shiny, with 20 coarse, round, setigerous, locally nearly contiguous punctures.

Clypeus and rest of head: Anterior margin hardly convex, lateral margins straight, somewhat convergent towards anterior margin; anterior margin bordered by a wide, flat and low elevation, bearing some fine, setigerous punctures, continued along lateral margins as a much narrower and somewhat higher, sharp-topped ridge; the ridge bifurcate at base of eye-canthus, one branch prolonged along anterior margin of eye-canthus, the other one, rather low, round-topped and ill-defined, reaching antero-medial margin of eye; derm shiny, densely set with round, deep, small, slightly unequal punctures, each one situated at bottom of an ill-defined depression and most with a very long, erect seta; punctures on vertex shallower and non-setigerous; eye-canthus with a tuft of about 18 setae, much shorter than discal ones.

Pronotum: Anterior margin, seen from above, nearly straight in middle, concave laterally before the acute antero-lateral angles; lateral margins convergent, shallowly concave in anterior half, weakly convex and subparallel in posterior half; postero-lateral angles subrectangular, their apices rounded off; posterior margin bisinuate; anterior margin bordered by a narrow, smooth band, hardly elevated medially, slightly more so towards antero-lateral angles, continued along lateral margins as a somewhat elevated ridge; the ridge sharp-topped anteriorly, more round-topped towards postero-lateral angles; posterior margin bordered by a narrow, darkened band, smooth except for some sparse, minute, inward directed setae on its extreme posterior rim; lateral margin serrulate, external slope of the bordering ridge with a dense fringe of somewhat reclined setae, partly still longer than discal ones, and weakly denser on postero-lateral angles; derm shiny, closely set with round, laterally umbilicate to horseshoe-shaped punctures of variable diameters, many punctures in posterior half of disc about twice as large as in anterior half; each puncture situated at bottom of an ill-defined, shallow



Figs. 71-75. *Phaeochroops peninsularis* Arrow, lectotype ♂. 71, Head with setosity; 72, punctation, discal and fringal setosity of pronotum; 73, right fore tibia; 74, punctation, discal and fringal setosity of elytra (posterior part of elytron full-drawn); 75, parameres of Kuala Lumpur ♂. Scale lines represent approximately 1 mm.

depression; the depressions locally contiguous or coalescent; most punctures with a long, erect seta.

Elytra: Sutural costa shiny, round-topped, posteriorly higher than anteriorly, with an apical denticle; first and second discal costae weakly elevated, third one flat, all three marked on both sides by a series of punctures; whole elytral surface, except for the sutural costa, with a faint silky gloss; non-costal areas set with horseshoe-shaped punctures, nearly round in basal part, more elliptic in middle part of disc, gradually more umbilicate and simple round punctures on lateral and apical declivities; punctuation rather dense, irregularly distributed except for the regular series bordering the costae; long and erect setae are arising from round or elliptic punctures, much smaller than the horseshoes and umbilicate punctures, rather numerous, and irregularly distributed except for a variably well defined, local seriation on and along the costae; many horseshoes and umbilicate punctures with an extremely fine, reclined seta on anterior apex of core, only visible under high magnification ( $\times 50$ ); lateral margins serrulate, bordered by a narrow ridge, somewhat wider and more rounded posteriorly, and obsolete before apex; external part of this ridge with a dense fringe of slightly backward directed setae, of varying, mixed, lengths, in general gradually shorter towards apex of elytron; in posterior half of margin the fringe is interrupted by 4-5 conspicuous, smooth, non-setigerous stretches; a vestigial accessory costa between bases of second and third discal costae.

Pygidium: Disc densely covered by somewhat transversely rugulose punctures, many with a recumbent seta; setae gradually longer from base to apex of pygidium; margins narrowly elevated, especially laterally, and with a dense fringe; most setae a little longer than elytral ones.

Fore tibia: Inferior surface with a series of 14-15, nearly equidistant denticles; basal accessory denticles nearly all somewhat directed backwards.

Middle and hind tibiae: No median, transverse ridges present.

Underside: Abdominal sternites with a rather dense cover of fine, recumbent setae of variable lengths, but in general gradually longer towards apex of abdomen.

Variation: Lengths 13.2-15.9 mm; anterior half of lateral margin of pronotum may be rectilinear; seriation in costal setosity sometimes more evident; most horseshoes may be subcircular and nearly closed; decrease in length of setae of fringe in elytron may be stronger; up to ten interruptions in elytral fringe may occur, distributed over whole length of margin; denticle at sutural angle may be absent; a trace of an impunctate, longitudinal band in middle of pronotum in some specimens; plus the usual insignificant variability in punctuation and setosity.

Type material. — Lectotype ♂ (designated by Bacchus, 1978) in London, labelled "♂"; "lectotype", print, violet ring; "Doherty" and "Perak L.C.", both in same hand; "Fry Coll. 1905-100", print; "*Phaeochroops peninsularis* Arrow type", in Arrow's hand; Bacchus's lectotype label. Paralectotype ♀ (London, designated by Bacchus, 1978) with labels "paralectotype", print, blue ring; "♀"; identical Doherty, Perak and Fry labels as in lectotype; Bacchus's identification and paralectotype labels.

Material examined. — Apart from the two type specimens I studied one ♂ (Paris) from Perak and 11 ♂, 6 ♀ from rainforest near Kuala Lumpur, Malaysia, baited with decaying fish (Leiden, coll. Kujten).

### ***Phaeochroops rattus* Arrow**

(figs. 76-80)

*Phaeochroops rattus* Arrow, 1909: 494 (diagnosis; type-loc. Setinjak, Sumatra).

*Phaeochroops rattus* Arrow, 1942: 927 (*P. mentawaiensis* Arrow is a synonym; key).

*Phaeochroops batuensis* Arrow, 1909: 495 (diagnosis; type-loc. Batu Islands; "extremely close to *P. niasianus*"). **Syn. nov.**

*Phaeochroops batuensis* Arrow, 1942: 928 (key).

*Phaeochroops mentawaiensis* Arrow, 1909: 495 (diagnosis; type-loc. Mentawai Islands; "at first sight exactly like *P. niasianus*").

*Phaeochroops mentawaiensis* Arrow, 1942: 927 (a synonym of *P. rattus*).

*Phaeochroops niasianus* Arrow, 1909: 494 (diagnosis; type-loc. Nias Island; "closely similar to *P. rattus* and *P. batuensis*"). **Syn. nov.**

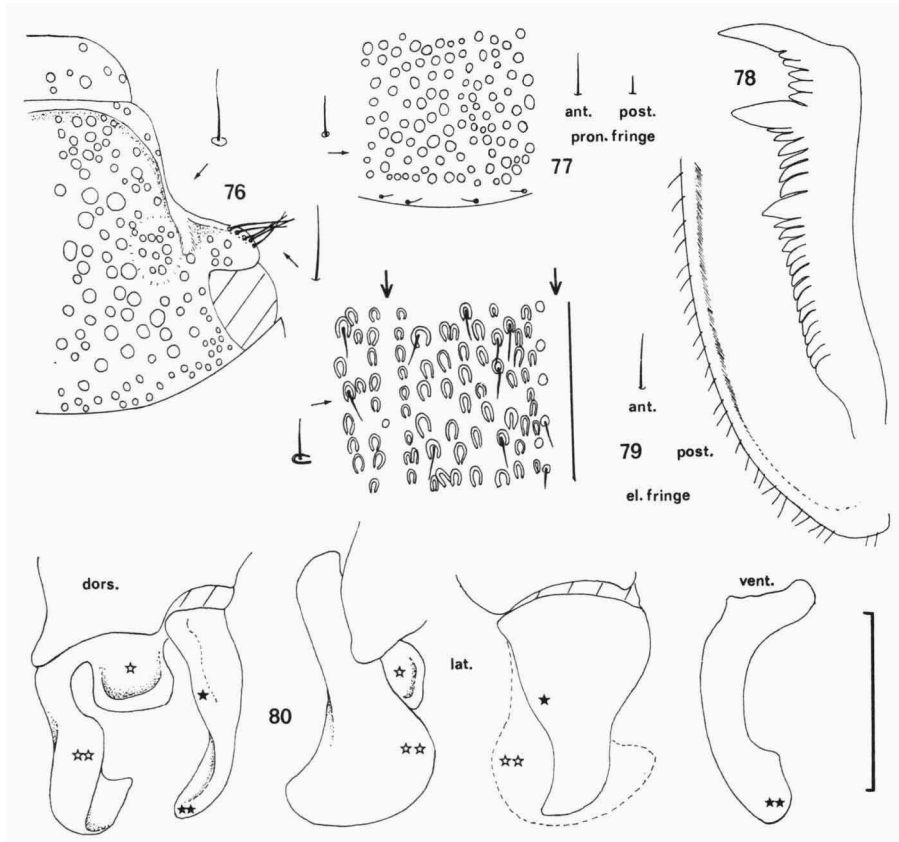
*Phaeochroops niasianus* Arrow, 1942: 928 (key).

Diagnosis. — Left paramere, in lateral view, with subsemicircular apical lobe, the quadrangular superior lobe with a transparent area; apex of right paramere somewhat curved upward; elytral setae on non-costal surface arising from large, horseshoe-shaped punctures, not from small, round ones.

Redescription of lectotype ♂. — Dark reddish brown with yellowish setosity; length  $1.3 + 2.5 + 6.0 = 9.8$  mm.

Labrum: Anterior margin nearly straight, lateral margins convex and convergent towards anterior margin; disc with about 12 setigerous punctures, variably large and distributed over whole surface.

Clypeus and rest of head: Anterior margin straight, lateral margins convergent towards anterior margin, straight; anterior margin bordered by a flat, wide, sparsely punctate, somewhat elevated band, continued along lateral margins as a much narrower and slightly higher ridge, fading out at apex of eye-canthus; a vestigial prolongation of this ridge branches off at base of eye-canthus, in direction of inner margin of eye; derm shiny and densely set with subcircular punctures of strongly varying diameters; each puncture situated at bottom of an ill-defined, shallow depression, the depressions



Figs. 76-80. *Phaeochroops rattus* Arrow, lectotype ♂. 76, Head with setosity; 77, punctation, discal and fringal setosity of pronotum; 78, left fore tibia; 79, punctation, discal and fringal setosity of elytra (posterior part of elytron full-drawn); 80, parameres. Scale line represents approximately 1 mm.

coalescent in several places; many punctures with an erect seta, but setosity absent in the very small punctures on vertex; eye-canthus with a tuft of five to six erect setae of about the same length as discal ones.

Pronotum: Anterior margin, seen from above, nearly straight in middle, somewhat concave shortly before acute antero-lateral angles; lateral margins in anterior one-third straight and convergent, straight and less convergent in posterior two-thirds; posterior margin bisinuate; anterior margin bordered by a slightly round-topped, low, laterally somewhat more elevated, smooth band, continued along lateral margins as a very narrow, rather sharp-topped, low ridge; the ridge gradually and strongly widening, more round-topped and higher in posterior two-thirds; postero-lateral angles subrectangular with

round apex; posterior margin bordered by a narrow, shiny band, impunctate except for a few extremely fine setigerous punctures along extreme margin; derm rather shiny and densely set with round, deep punctures of varying size, some umbilicate; each puncture at bottom of a shallow, ill-defined depression; many punctures with an erect seta; external margin of lateral ridge serrulate, fringed with widely separated setae, anteriorly of about same length as the discal ones, but strongly and gradually shortening in posterior direction.

Elytra: Sutural costa round-topped, smooth, shiny, slightly widening and higher in posterior direction, apex hardly denticulate; first and second discal costae weakly elevated, the third one only locally recognizable as an impunctate band; no accessory costa between bases of second and third discal costae; all discal costae completely disappearing on apical declivity; non-costal surface shiny, densely set with mostly shallow punctures, irregularly distributed, except for linear series along the borders of costae; the punctures elliptic, horseshoe-shaped on disc, more circular, horseshoe-shaped, umbilicate or simple on sides and apical declivity; many punctures at bottom of an ill-defined, shallow depression, the depressions locally coalescent; surface with erect or slightly recumbent setae, very scarce on costae; setae mostly irregularly distributed, but distinctly seriate along sutural costa and locally vaguely seriate at various distances along the discal costae; except for the series along sutural costa and a few ones on the discal costae, which arise from small, round, simple punctures, all setae implanted in the horseshoes; lateral margins weakly serrulate, anteriorly bordered by a very narrow ridge, gradually and considerably widening in posterior direction, round-topped over most of its length and obsolete before apex; external margin of ridge thinly fringed with setae somewhat longer than discal ones anteriorly, near humeral umbone, but considerably shorter for the rest.

Pygidium: Finely and densely punctate, each puncture with a thin, recumbent seta, longer than on elytral disc; margins with a dense fringe, especially so on apex.

Fore tibia: Basal accessory denticles acute, the majority directed backward.

Middle and hind tibiae: A weak, transverse carena, set with a few thick and short setae, is present at middle on external surface of tibiae.

Underside: Abdominal sternites with sparse, recumbent setae of about the same length as elytral ones.

Variation: Apart from the usual, faint variations in form, depth, diameter of punctures etc., the following may be noteworthy: many specimens are more reddish; vertex may show a more or less large, smooth, median area; anterior third of lateral margins of pronotum may be slightly concave; setae

bordering sutural costa may be shorter than the other ones; the smooth band along posterior margin of pronotum may occupy only the median part of the margin; sutural denticle may be well developed; transparency in superior lobe of left paramere variably developed; lengths ♂ 9.2-10.8 mm; ♀ 10.3-11.0 mm; additionally, the Malaccan specimens may be nearly black, their setosity is somewhat more abundant, the setae a little longer.

Type material. — Lectotype ♂ and paralectotype ♀ (London), here designated, with labels "syntype", print, blue ring; "type", print, red ring, only in lectotype; "Setinjak Sumatra 1800 ft. jan. '98, 99-55", print; "*Phaeochroops rattus* Arrow type", hand, on lectotype only; Bacchus's name and syntype labels. Paralectotypes, 4 ♀ (Genoa), here designated, labelled "Sumatra, Si-Rambé xii.90-iii.91, E. Modigliani", print; "cotypus!", handwritten; "*rattus* Arrow", handwritten, recent, custodial label; "Mus. Civ. Genova", print; in one specimen "*Phaeochroops rattus* Arrow co-type", in Arrow's hand. All six specimens with my lectotype labels.

Note on the type series. — In a letter of January 1979 Dr Poggi of the Genoa Museum informed me, that the syntypes from Setinjak are only two (London) and from Si-Rambé are four (Genoa); this rectifies the numbers given by Bacchus (1978).

Material examined. — Apart from the type series I studied one ♀ from Modigliani's Si-Rambé series (Dresden), labelled *P. rattus* by Arrow, that might have belonged to the original material. Further I saw many specimens, ♂ and ♀, from Sumatra and Malaysia, and 1 ♂ from Java (Amsterdam, Dresden, coll. Kuijten, Leiden, Paris); the labels give localities from sea level to 1300 m and fish and chicken carrion as attractant.

*Phaeochroops batuensis* has to be considered a synonym of *P. rattus*, as all its characters fall within the range of variability of that species; *P. rattus* has page priority.

Type material. — Lectotype ♂ and 5 paralectotypes, 3 ♂, 2 ♀ (London), here designated, with labels "syntype", print, blue ring; "type", print, red ring, and "*Phaeochroops batuensis* Arrow type", Arrow's hand, in lectotype only; "*Phaeochroops batuensis* Arrow cotype", Arrow's hand, in one paralectotype only; "Isole Batu 1896-97 H. Raap", print; "Genoa Mus. 1909-158", print; Bacchus's identification and syntype labels. Nine paralectotypes, 2 ♂, 7 ♀ (Genoa), here designated, labelled "Isole Batu 1896-97 H. Raap", print; "cotypus!", hand; "Mus. Civ. Genova", print; in 1 ♀ "*Phaeochroops batuensis* Arrow co-type", in Arrow's hand; some specimens bear a (recent?) custodial label "*P. batuensis* Arrow det. Arrow". All 15 type specimens with my (para)lectotype labels.



Notes on the type material. — The Batu Islands are situated between Nias and the Mentawai Archipelago, off the western coast of Sumatra, and do not belong to Sulawesi (Celebes), as suggested in Bacchus's catalogue (1978). In Genoa are 9 syntypes (paralectotypes), not only one, as given by Bacchus (1978), according to a confirmation by Dr Poggi of that museum, in a letter of Jan. 1979.

*Phaeochroops mentawaiensis* has been synonymized with *P. rattus* by Arrow himself (1942), and my study of the parameres affirms his opinion; *P. rattus* has page priority.

Type material. — Lectotype ♂ (London), here designated, labelled "syntype", print, blue ring; "type", print, red ring; "Mentawai Sipora Sereinu v-vi.94, Modigliani"; "*Phaeochroops mentawaiensis* Arrow type", in Arrow's hand; Bacchus's name and syntype label; paralectotype ♀ (London), here designated, with labels "syntype", print, blue ring; "Mentawai Si Oban iv-viii.94, Modigliani"; "*Phaeochroops mentawaiensis* Arrow cotype", in Arrow's hand; Bacchus's name and syntype labels. Three paralectotypes, ♂ (Genoa), here designated, all with same locality label as lectotype, all with handwritten "cotypus"; two specimens with handwritten name and cotype labels; one with an additional "not *P. silphoides* Fm t. [illegible]". All specimens with my name and (para)lectotype labels.

Material examined. — Apart from the type specimens I saw one ♂ and ♀ (Dresden), labelled "Padang Pandjang West-Sumatra H. Rolle Berlin W."; "Coll. C. Felsche Kauf 20, 1918"; the ♂ bears additional labels "Typus" and "*Phaeochroops mentawaiensis* Arr. G. J. Arrow det."; the ♀ "*mentawaiensis* Arrow Typus 70 1". As Arrow in his original description only mentions the Modigliani specimens from Mentawai Islands, the type labels in the Sumatran specimens must be later, unjustified additions. I identified both specimens as *P. rattus*.

*Phaeochroops niasianus* in all characters falls within the variability of *P. rattus*, so I consider it a synonym of that species; again *P. rattus* has page priority.

Type material. — Lecto- and two paralectotypes, all ♀ (London), here designated, with labels "Syntype", print, blue ring; "type", print, red ring, only in lectotype; "Is. Nias, 1897-98 U. Raap"; "Genoa Mus. 1909-159", print; Arrow's handwritten identification label with type indication, in lectotype; the same with cotype indication, in one paralectotype; Bacchus's name and syntype labels. Five paralectotypes, 1 ♂ and 4 ♀ (Genoa), here designated, labelled "Is. Nias, 1897-98 U. Raap"; "Mus. Civ. Genova"; "Cotypus!";

three specimens with handwritten (? recent) custodial label "*P. niasianus* Arr. det Arrow"; one specimen with "*Phaeochroops niasianus* Arrow co-type", in Arrow's hand. All eight specimens with my (para)lectotype labels.

Note on the lectotype. — I designated a London ♀ as lectotype, and not the Genoa ♂, because of Arrow's type indication, and its location in London, where all Arrow's lectotypes are kept.

***Phaeochroops seres* sp. nov.**

(figs. 81-85, pl. 4)

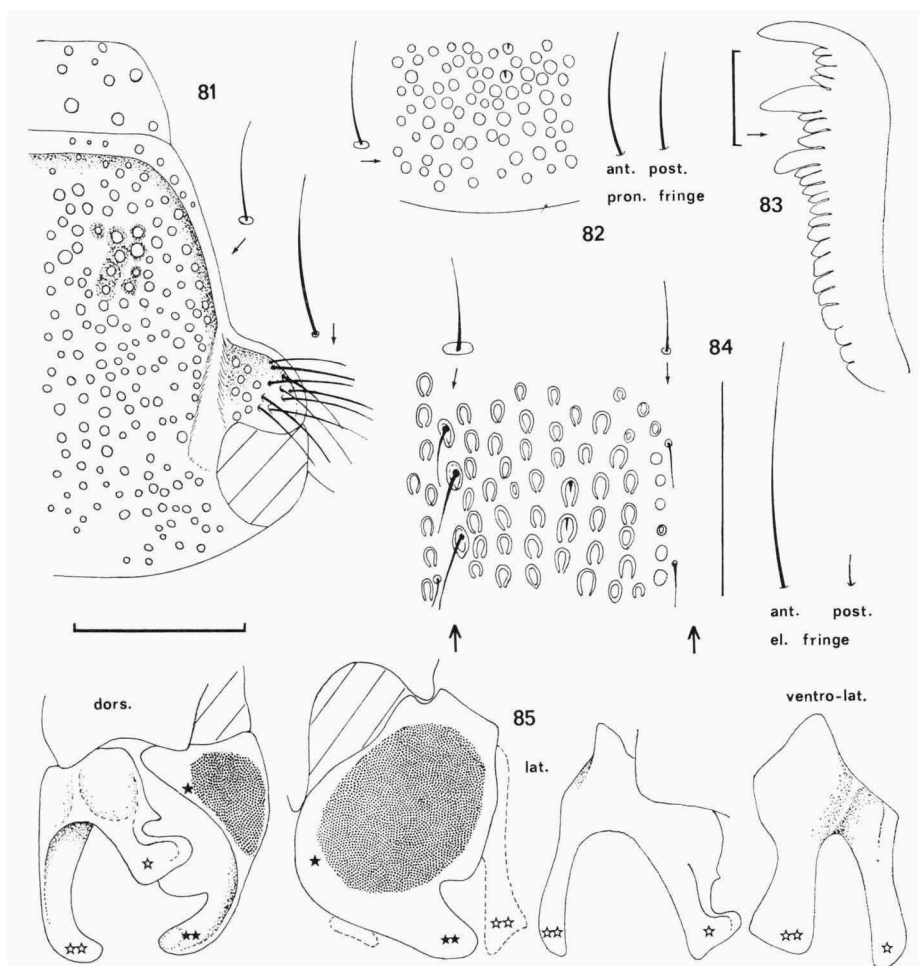
Diagnosis. — Apex of inferior lobe of left paramere subangular in lateral view; right paramere with short, downward, apical protrusion, inner surface of extreme apex slightly swollen; elytral fringe without interruptions; elytral setosity only on the costae, arising from ill-defined horseshoe-shaped punctures of about the same size as the intercostal ones; middle and hind tibiae with a distinct, transverse ridge on middle of external surface; no accessory costa between bases of second and third costae.

Description of holotype ♂. — Blackish brown, with yellowish brown setosity; length  $1.8 + 4.5 + 10.8 = 17.1$  mm.

Labrum: Anterior margin straight, lateral margins faintly convex, converging towards anterior margin; disc shiny, with 20 widely separated, shallow, round, setigerous punctures of varying diameters.

Clypeus and rest of head: Anterior and lateral margins straight, the latter convergent towards anterior margin; anterior margin bordered by a flat, elevate band, set with some punctures and continued along lateral margins as a much narrower and somewhat higher ridge; the ridge bifurcate at base of eye-canthus, one branch reaching apex of canthus, the other one, wider, lower, round-topped and poorly delimited, reaching inner margin of eye; surface, except for a small, punctureless, medial area on vertex, set with deep, round, more or less umbilicate, unequal punctures; many punctures situated at bottom of an ill-defined, shallow depression (some are indicated by fine dotting in fig. 81), the depressions often contiguous, considerably varying in diameter and depth; several other punctures carved in the derm itself; many punctures with an erect, long seta; eye-canthus with a tuft of about 15 erect setae, longer and thicker than the fronto-clypeal ones.

Pronotum: Anterior margin, seen from above, nearly straight in middle, concave before the sharp antero-lateral angles; lateral margins serrulate, evenly rounded, converging towards anterior margin; posterior margin bisinuate; anterior margin bordered by a flat and rather wide, low elevation, somewhat higher and narrower towards antero-lateral angles, continued along lateral margins as a narrow, sharp-topped carena in anterior one-third; the



Figs. 81-85. *Phaeochroops seres* Kuijten, holotype ♂. 81, Head with setosity; 82, punctation, discal and fringal setosity of pronotum; 83, left fore tibia; 84, punctation, discal and fringal setosity of elytra; 85, parameres; grey areas transparent. Scale lines represent approximately 1 mm.

carina gradually and strongly wider and higher, and more round-topped, in posterior two-thirds; along posterior margin a narrow band, less distinct towards postero-lateral angles, impunctate except for a scanty series of extremely fine, setigerous punctures on its extreme rim; derm shiny, but slightly mat in posterior part of disc, densely set, though less so in anterior part of disc, with round punctures of varying diameters and depths; punctures often situated, especially in lateral areas, at bottom of a shallow, ill-defined depression; the depressions often contiguous or coalescent in short, longitudinal series; some punctures with a long, more or less reclined seta,

many others with a minute, recumbent seta, shorter than diameter of puncture; external part of the lateral carena fringed with long and thick setae, somewhat denser at the subrectangular postero-lateral angles.

Elytra: Sutural costa round-topped, slightly mat anteriorly, gradually wider, higher, more round-topped and shiny in posterior direction; first and second discal costae distinctly, the third one hardly elevated, all obsolete on apical declivity; no accessory costa between bases of second and third discal ones; derm, including discal costae, mat, with a strongly silky aspect, caused by extremely dense and fine microsculpture, only humeral and apical umbones shiny; non-costal surface set with horseshoes of variable size, or, laterally and apically, with umbilicate or simple punctures; many horseshoes with an extremely fine, recumbent seta, arising from apex of core, shorter than diameter of horseshoe; punctures along the costae more or less uniseriate, for the rest irregularly distributed or forming short, less pronounced, longitudinal series; the long setosity is restricted to the costae; external margin of sutural costa with a series of recumbent setae, in general somewhat shorter than those on discal costae, arising from very small, round punctures; discal costae with long, reclined setae, partly situated on top, partly on margins of costae, arising from rather ill-defined, often nearly closed horseshoes of the same size as the intercostal ones; lateral margins simple, bordered by a narrow, sharp-topped ridge in anterior part, more round-topped and slightly wider posteriorly, obsolete near apex; external part of ridge with a dense fringe of backward setae, much longer than the discal setae in anterior part, but gradually and strongly shortening towards apex; sutural angle with distinct denticle.

Pygidium: Disc finely and densely punctate and with dense setosity, setae somewhat thinner and longer than elytral ones; margins with a fringe of very long, slender setae.

Fore tibia: Basal accessory denticles rather blunt, protruding in lateral direction.

Middle and hind tibiae: In both pairs a distinct, transverse, setigerous carena present at middle of external surface.

Variation of ♂ and ♀: Insignificant variations in density and form of punctures, in colour, in thickness of lateral ridge of pronotum, in degree of curvature of lateral, pronotal margins etc. occur; setosity may be somewhat more developed in ♀; the Laos specimens with only an extremely scarce setosity on the discal costae; lengths ♂ 15.0-17.1 mm, ♀ 15.7-17.4 mm.

Type material. — Holotype ♂ and 18 paratypes (14 ♂, 4 ♀) in Budapest and Leiden, labelled "Vietnam, Cuc Phuong, Ninh Binh, 11-17.v.1966, Exp. Gy Topál"; "Nr 361 from carcass". Twelve paratypes (9 ♂, 3 ♀) in Buda-

pest, with same locality labels, but "Nr 396 from under carcass". Paratype ♂, in London, labelled "Haute Mekong, Nam Tiene 14.iv.1918 R.V. de Salvaza"; "Brit. Mus. 1921-89"; "2055". Paratype ♀, in London: "Louang Prabang, Houei Ko, 14.iii.1918 R.V. de Salvaza"; "Brit. Mus. 1921-89". Paratype ♂, in Paris, labelled "Laos Nam Tiene, le 14.iv.1918, R. Vitalis de Salvaza"; "2055". All specimens with my name and (para)type labels.

Note. — The Paris specimen from Nam Tiene is probably the one erroneously identified as *opacicolis* by Paulian and included under that name in his Faune (1945). Paulian's description deviates in several essential respects from Arrow's description of *P. opacicolis*, and from the characters concerned of the type specimens of that species.

Material examined. — Only the type series.

Derivation of name. — After the Seres (a name for the Chinese in Antiquity) who gave their name for many words referring to silk, e.g., sericeous, sericulture; because of the silky aspect of the elytra.

### **Phaeochroops silphoides** Fairmaire

(figs. 86-91)

*Phaeochroops silphoides* Fairmaire, 1898: 383 (diagnosis; type-loc. Sumatra).

*Phaeochroops recticollis* Pic, 1928: 4 (diagnosis; type-loc. Palawan). **Syn. nov.**

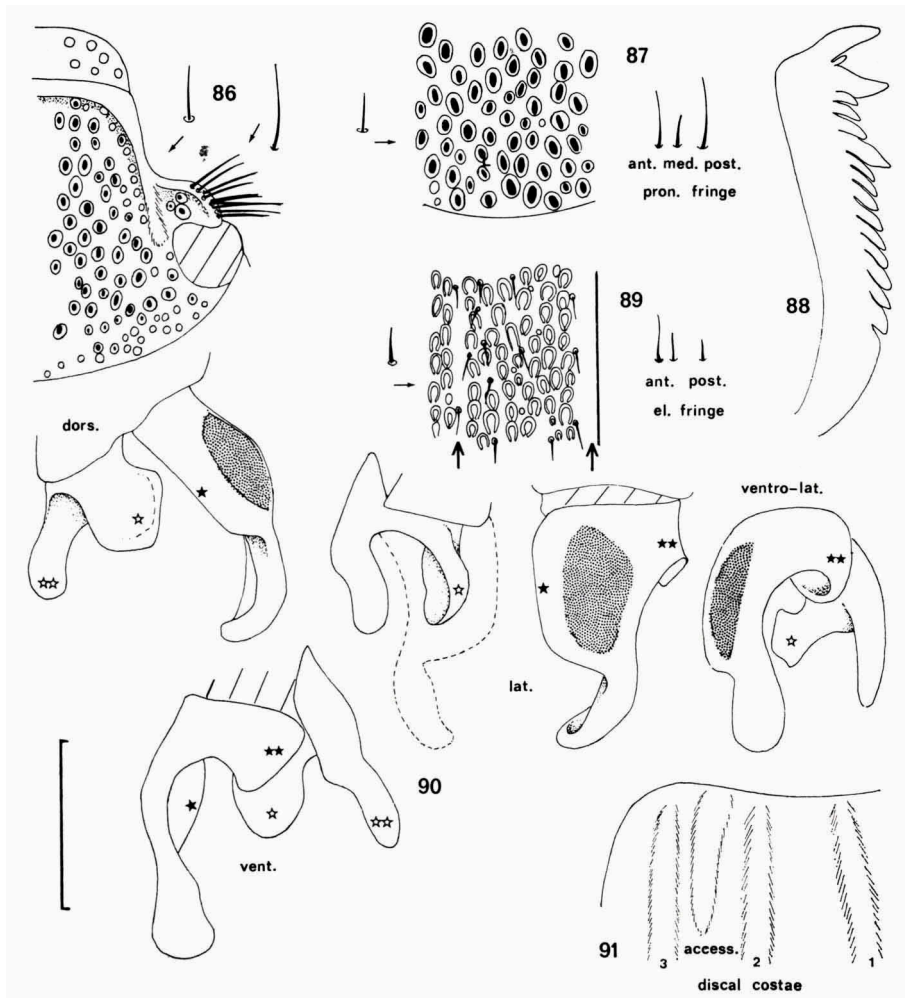
*Phaeochroops recticollis* Pic; Arrow, 1942: 928 (key; *P. silphoides* not seen by Arrow).

Diagnosis. — Upper lobe of left paramere strongly developed, terminal protrusion of right paramere slender, bent upward, right paramere with a central transparent area; elytral fringe without interruptions; elytral setae arising from small, round punctures; an accessory, short costa present between bases of second and third discal costae; intercostal spaces shiny; no transverse ridges on middle of external surface of middle and hind tibiae.

Redescription of holotype ♂. — Dark reddish brown, setosity yellowish brown; length  $1.1 + 2.0 + 5.9 = 9.0$  mm (Fairmaire gives 6 mm).

Labrum: Anterior and lateral margins curved; disc shiny, with about 12 shallow, widely separated punctures, each one with an erect seta.

Clypeus and rest of head: Anterior margin weakly curved, lateral margins straight, convergent towards anterior margin; anterior margin bordered by a flat elevation, continued along lateral margins as a somewhat higher, narrower and more round-topped ridge; this ridge bifurcate at base of eye-canthus, one branch prolonged along anterior margin of eye-canthus, the other one, poorly delimited, low, smooth, round-topped, reaching inner margin of eye; derm shiny, closely set with coarse, elliptic to subcircular, mostly distinctly umbilicate, punctures, each one situated at bottom of a shallow,



Figs. 86-91. *Phaeochroops silphoides* Fairmaire, holotype ♂. 86, Head with setosity; 87, punctation, discal and fringal setosity of pronotum; 88, right fore tibia; 89, punctation, discal and fringal setosity of elytra; 90, parameres of *Loeboe Radjah* ♂; grey area transparent; 91, basis of left elytron, with three discal costae and a short accessory one.

Scale line represents approximately 1 mm.

poorly defined depression; diameters of punctures very unequal, especially on vertex and along clypeal margin the punctures are very small, without setae; large punctures with an erect seta; eye-canthus with a tuft of about 10 setae, considerably longer than the fronto-clypeal ones.

Pronotum: Anterior margin, seen from above, straight, but weakly con-

cave shortly before acute antero-lateral angles; lateral margins somewhat converging towards anterior margin, weakly curved in anterior two-thirds, straight in posterior one-third; posterior margin weakly bisinuate; anterior margin bordered medially by a poorly delimited, smooth band, slightly elevated, narrower and with a few setigerous punctures before antero-lateral angles; lateral margins bordered by a sharp-topped, weakly elevated ridge in anterior one-fourth, gradually wider and higher and strongly round-topped in posterior three-fourths; posterior margin only medially with a short, narrow, smooth, poorly delimited zone, laterally the punctuation reaches extreme margin; derm shiny, densely set with unequal, coarse, elliptic, mostly umbilicate punctures, the smaller, more circular punctures dominating along anterior and posterior margins; each puncture at bottom of an ill-defined, shallow depression, the depressions locally coalescent in short, more or less longitudinal series; most punctures with a slightly reclined seta, arising from anterior apex of umbilicus; lateral ridge externally with a scanty fringe of suberect setae, longer than discal ones near antero-lateral angles, gradually shortening in posterior direction to about half the original length, again increasing in length and density on postero-lateral angles, occupying also the most lateral part of posterior margin.

Elytra: Sutural costa elevated, round-topped, slightly widening toward apex, sutural angle with denticle; first and second discal costae shiny, rather conspicuously elevated, round-topped, the third one only present as a flat, shiny, impunctate band; all discal costae obsolescent on apical declivity; between bases of second and third discal costae a short, high, shiny accessory costa; non-costal derm less shiny than the costae, closely set with oblong, often nearly closed, horseshoe-shaped punctures, more umbilicate in apical area; punctures seriate along costae, irregularly distributed or composing short series on rest of surface; each puncture situated at bottom of an ill-delimited depression, the depressions locally coalescent in short, more or less longitudinal series; non-costal surface with sparse, erect or somewhat reclined setae, mostly irregularly distributed, but arranged in short, longitudinal series locally in basal half of elytron; external margin of sutural costa with a series of widely separated setae; discal costae with a few, widely spaced, central setae; all those setae arising from very small, round punctures; lateral margins without distinct serrulation, anteriorly bordered by a narrow, sharp-topped ridge, gradually higher and wider and more round-topped in posterior two-thirds, obsolete before apex; external surface of this ridge with a scanty fringe of erect or backward setae; anteriorly setae in general somewhat longer than the discal ones, shorter than discal ones along rest of margin, not increasing in length before apex.

Pygidium: Disc set with round punctures, often transversely confluent in twins, each one with a long, recumbent seta; margins rather densely fringed.

Fore tibia: Basal accessory denticles and the basal, large lateral tooth acute and strongly directed backward.

Middle and hind tibiae: No transverse, median ridge present.

Variation: Some variation in development of third discal costa, in density of setosity, in depth and density of punctation may be observed; the color may be black on elytra; lengths ♂ 9.0-9.8 mm, ♀ 9.5-11.0 mm.

Type material. — Holotype ♂ (Paris), labelled "Palembang Sumatra", print; "Type 1898", print and hand combined; "*Phaeochroops silphoides* Fm Sumatra", in Fairmaire's hand; "Museum Paris 1906 Coll. Léon Fairmaire", print. Holotype by monotypy: no mention of more specimens in description; description gives only one length; no more Sumatran specimens present in Paris.

Material examined. — Apart from the holotype I saw 1 ♂ from Loeboe Rajah, Sumatra (Dresden), 2 ♀ from Air Njuruk, Sumatra (Leiden), 3 ♀ from Palawan (Dresden), 1 ♂, 2 ♀ from Kina Balu (Paris), 1 ♂, 2 ♀ from N. E. Borneo (Dresden), 2 ♂, 1 ♀ from Mount Mulu Ntl Park, Sarawak, fish bait, alluvial forest, 100 m (Leiden).

*Phaeochroops recticollis* falls in all external characters within the range of variability of *P. silphoides*; the abdominal contents of the only known ♂ were eaten by a museum pest insect.

Type material. — Holotype ♂ (Paris), labelled "Süd-Palawan", print; "type", Pic's hand; "type", red, print; "*recticollis* n. sp.", Pic's hand; my label.

Note on the type material. — Judged from the length indication (6.9 mm), Pic based his description on more than one specimen, without designation of a holotype. Two specimens only, a ♂ and ♀ in Paris, may claim to be syntypes, both being labelled "type" by Pic. The ♀, however, bears only this type label plus a recent, custodial name label (*recticollis*). Therefore I think it justified to exclude it as syntype candidate, and to consider the fully labelled ♂ the holotype, rather than to designate the specimens lectotype and paralectotype. An additional complication are the lengths given by Pic. According to my measurements the specimens are 9.9 and 10.0 mm, a discrepancy with Pic's length for the smallest (6 mm) not explicable from different methods of measuring.

### ***Phaeochroops taiwanus* Nomura**

*Phaeochroops taiwanus* Nomura, 1973: 39 (diagnosis; fig.; type-loc. Funchiifo, Taiwan; compared with *P. gigas* Arrow).



Note. — In spite of several attempts I could not study the type specimens. The following description is based on Nomura's text, partly literally quoted.

Description. — "This is nearly allied to *P. gigas* Arrow, but it differs from the latter in the smaller body, rather coarsely punctate pronotum, the shorter median smooth area of the pronotum and the less elevated elytral costae." "Rufo-piceous, with antennae, tibiae and tarsi, sometimes sides of pronotum and of elytra red-brown", setosity brownish; length of head not given, of pronotum 3.0 mm, of elytra 8.0 mm, total length 10.2-11.2 mm.

Labrum: "quadrate, feebly emarginate at anterior margin".

Clypeus and rest of head: "Head coarsely, densely punctate, with occiput almost smooth, clypeus subtrapezoid", with scattered, long, suberect setae.

Pronotum: Lateral margins convergent toward anterior margin, "nearly straight at apical third, feebly rounded behind, narrowly margined in front, becoming stouter posteriorly, finely serrate, fringed with long hairs, front angles sharply produced and acute, hind ones subrectangular and rounded at tip"; surface shiny, "coarsely, densely punctate, with scattered long erect hairs, an elongate smooth area in middle".

Elytra: Shiny, "lateral margins fringed with long hairs, becoming shorter posteriorly, surface coarsely, somewhat densely punctate, punctures horse-shoe-form on basal two-thirds, annulate on apical area"; "with sutural and four feeble discal costae, each costa bears a row of sparse suberect long hairs, 4th costa nearly flat, with a short row of about five hairs behind middle"; no setosity on non-costal surface is mentioned; in the short diagnosis Nomura says "body shining, ..., dorsal surface clothed with scattered long suberect brownish hairs"; judged from the figure, however, this only refers to the costae. An accessory costa is not mentioned.

Fore tibiae: "serrate and tridentate on outer edge".

Middle and hind tibiae: Nomura made no reference to a transverse, setigerous carena at about half the length of tibia, on external surface.

Underside: "somewhat longitudinally rugose on each side, transversely so in the middle, with scattered short recumbent hairs".

Type material. — Holotype ♀ (coll. Nomura), from Funchiifo, 27.iii.1970. Paratype ♀ (coll. Shibata), Funchiifo, 31.v.1970.

Material examined. — I studied 1 ♀ from Fenchihu (? = Funchiifo), 1400 m, Taiwan (Geneva), that rather well agrees with Nomura's description. Some essential characters, however, were not described by Nomura. Therefore a conclusion about conspecificity, without study of the types, is not justified. The specimen would key out near *P. colopacilis*. It shows the following characters, relevant for the key, and not given by Nomura: elytral fringe complete, length of fringal setae not increasing before apex, only

setae on costae in elytral disc, transverse ridges of middle and hind tibiae hardly developed, no accessory costa on base of elytron, setae of elytral fringe shorter than costal ones.

***Phaeochroops vulpecula* Arrow**

(figs. 92-96)

*Phaeochroops vulpecula* Arrow, 1909: 493 (diagnosis; type-loc. Mentawai Isl.: Sipora; compared with "extremely close" *P. peninsularis*).

*Phaeochroops vulpecula* Arrow, 1942: 928 (key).

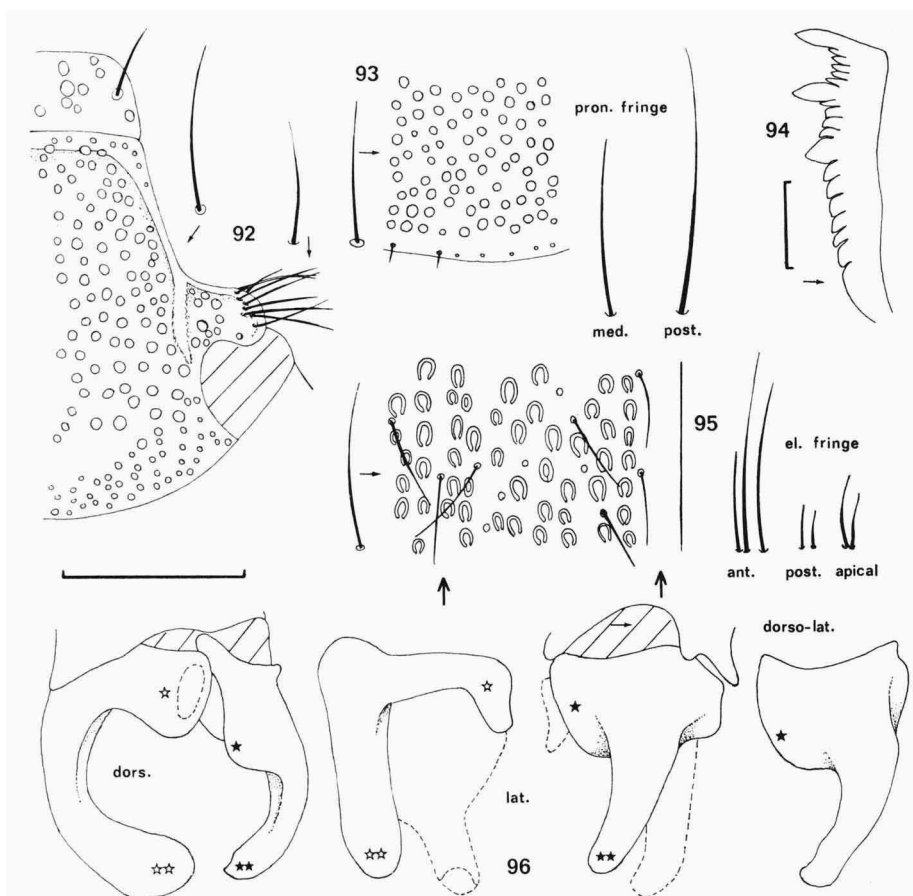
Diagnosis. — Lower lobe of left paramere strongly developed, right paramere, in lateral aspect, with long and slender, somewhat curved upward apical protrusion, its extreme apex curved inward; elytral fringe without interruptions; length of setae of fringe strongly decreasing from anterior to posterior, but considerably increasing again before elytral apex; no median, transverse ridge in middle and hind tibiae; none or a vestigial accessory costa between bases of second and third discal costae; setosity reddish brown.

Redescription of lectotype ♂. — Dark reddish brown, setosity reddish brown; length  $1.5 + 3.0 + 8.0 = 12.5$  mm.

Labrum: Anterior and lateral margins straight, the latter converging in anterior direction; disc shiny, with about 20 shallow, round punctures, most with a seta, somewhat reclined forward.

Clypeus and rest of head: Anterior margin nearly straight, lateral margins straight, convergent towards anterior margin; anterior margin bordered by a flat, sparsely punctate, weakly elevated band, continued along lateral margins as a narrower, and slightly higher ridge; the ridge bifurcate at base of eye-canthus, one branch continued along anterior margin of canthus, the other one prolonged as a poorly delimited, low, smooth ridge towards inner margin of eye; derm shiny, densely set with subcircular, irregularly distributed punctures; each puncture situated at bottom of an ill-defined, shallow depression, most with a long, suberect seta; vertex with a narrow, transverse, impunctate band, punctures of vertex much smaller and in smaller depressions than the fronto-clypeal ones; eye-canthus with a tuft of about ten, closely set, erect setae, somewhat shorter than discal ones.

Pronotum: Anterior margin, seen from above, weakly concave, somewhat more so before the acute antero-lateral angles; lateral margins very weakly concave before antero-lateral angles, evenly and slightly rounded in posterior two-thirds, convergent towards anterior margin in anterior half; posterior margin weakly bisinuate; anterior margin bordered by a flat, weakly elevated, rather wide band, slightly narrowing before antero-lateral angles, continued



Figs. 92-96. *Phaeochroops vulpecula* Arrow, lectotype ♂. 92, Head with setosity; 93, punctation, discal and fringal setosity of pronotum; 94, left fore tibia; 95, punctation, discal and fringal setosity of elytra; 96, parameres. Scale lines represent approximately 1 mm.

along lateral margins as a narrow, weakly elevated ridge, hardly widening in posterior direction; along posterior margin a narrow band, impunctate except for a transverse series of extremely fine, partly setigerous punctures; derm shiny, closely set with round, somewhat unequal punctures, each one at bottom of a poorly delimited, shallow depression, partly with a long, erect or somewhat reclined seta; external surface of lateral ridge with a dense fringe of variably long, erect setae; most setae longer than discal ones, somewhat denser, still longer and more reclined on the subrectangular postero-lateral angles.

Elytra: Sutural costa elevated, round-topped, smooth and shiny, with a

weak apical denticle; first and second discal costae weakly elevated, the third one only discernible as a smooth band; discal costae obsolete on apical declivity; non-costal derm shiny, set with horseshoe-shaped punctures, each one at bottom of a very poorly defined, shallow depression; punctures on apical declivity and near lateral margins varying from umbilicate to simply round; except for single series along margins of costae, the punctures are irregularly distributed; elytral setae long, erect or slightly reclined, arising from round punctures, much smaller than the horseshoes; some widely separated setae in posterior part of discal costae; a series of widely separated setae along whole external margin of sutural costa, somewhat denser in its apical part; some moderately defined series of setae near to and parallel with discal costae; a sparse, scattered setosity on rest of non-costal surface; the setae near discal costae often reclined in such a way that they cross above the costae; many large punctures in apical declivity with a minute, recumbent seta, shorter than diameter of puncture; lateral margins simple, bordered by a narrow, somewhat sharp-topped ridge, slightly wider and more round-topped in posterior part and obsolete at extreme elytral apex; external surface of ridge with a fringe of variably long, relatively dense, more or less erect setae in anterior half, rather abruptly much shorter and scarcer at about middle, very short and scanty in greater part of posterior half, but considerably longer and denser again at extreme apex; no accessory costa between bases of second and third discal costae.

Pygidium: Disc finely punctate, punctures partly confluent, most with a yellow seta, rather short basally, longer than elytral setae on central disc and along margins.

Fore tibia: Only six, obtuse, backward directed, basal accessory denticles.

Middle and hind tibiae: No transverse, setigerous ridges present in middle of external surface.

Variation: Smooth area on vertex may be absent; more accessory denticles in fore tibia, a trace of an accessory, short costa between second and third discal costae may be present; some variation in development of superior and inferior lobe in left paramere and in apical protrusion of right paramere in Sumatran and Malaccan specimens.

Type material. — Lectotype ♂ in London, here designated, labelled "Syn-type", print, blue ring; "Type", print, red ring; "Mentawai Sipora Sereinu, v-vi.94 Modigliani", print; "Genoa Mus. 1909-158", print; "*Phaeochroops vulpecula* Arrow type", in Arrow's hand; Bacchus's name and syntype label; paralectotype ♀, in London, here designated, with same labels, but without "type" and with Arrow's cotype indication; paralectotype ♀, in Genoa, here designated, labelled with identical Modigliani label; "cotypus!", handwritten;

"*vulpecula* Arrow cotype", recent, custodial, handwritten label; paralectotype ♀, Genoa, here designated, with same Modigliani label; "*vulpecula* Arrow", hand; "cotypus!", hand; "*Phaeochroops vulpecula* Arrow co-type", in Arrow's hand; "Mus. Civ. Genova", print; paralectotype ♂, in Genoa, here designated, labelled with same Modigliani label; "cotypus!", handwritten; "Museo Civ. Genova", print; "*P. vulpecula* Arrow, det. Arrow", recent, written, custodial label. All specimens with my (para)lectotype labels.

Material examined. — Apart from the type series I saw one ♂ (Dresden) with an identical Modigliani label. Two ♂ from Setinjak, Sumatra (Dresden) and Malaka (Paris) show slight external and genital differences and may preliminarily be included here, though subspecific status may be possible, when more material has become available.

***Phaeochroops vulturius* sp. nov.**

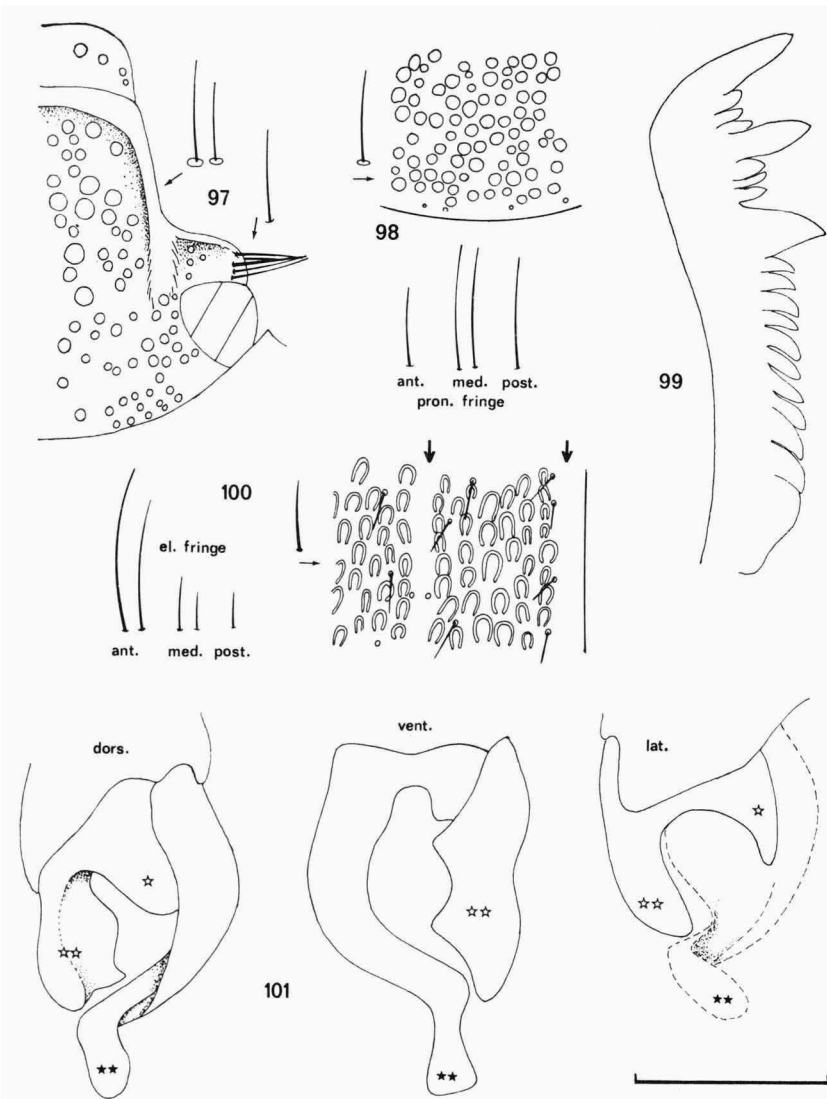
(figs. 97-101)

Diagnosis. — Apical protrusion of right paramere slender, angularly directed backward and upward, lower lobe of left paramere with a denticle before apex on inner side of inferior margin; accessory costa present between bases of second and third discal costae, intercostal areas shiny, discal setosity in elytra virtually restricted to intercostal areas (a few setae on third discal costa only); elytral fringe uninterrupted, length of setae of fringe strongly decreasing in posterior direction, no ante-apical increase in length; a median, transverse, setigerous ridge only present in middle tibiae.

Description of ♂ holotype. — Dark reddish brown, setosity reddish brown; length  $1.4 + 2.8 + 8.3 = 12.5$  mm.

Labrum: Anterior margin and sides nearly straight, the latter converging towards anterior margin; disc shiny, with about ten, shallow, setigerous punctures, mainly arranged along margins.

Clypeus and rest of head: Anterior margin weakly convex, lateral margins straight, convergent towards anterior margin; anterior margin bordered by a flat, rather wide, smooth elevation, continued along lateral margins as a narrower and higher ridge; the ridge bifurcate at base of eye-canthus, one branch, narrow and well defined, continued over some distance along anterior margin of canthus, the other one, ill-delimited, but well distinct, wider, round-topped, prolonged towards inner margin of eye; derm shiny, rather closely set with deep, round punctures of strongly varying diameters, leaving several small areas unoccupied; most punctures at bottom of an ill-defined depression, many punctures with an erect seta; apex of eye-canthus with a tuft of about ten erect setae, of approximately same length as the clypeo-frontal ones.



Figs. 97-101. *Phaeochroops vulturius* Kuijten, holotype ♂. 97, Head with setosity; 98, punctation, discal and fringal setosity of pronotum; 99, right fore tibia; 100, punctation, discal and fringal setosity of elytra; 101, parameres. Scale line represents approximately 1 mm.

Pronotum: Anterior margin, seen from above, weakly concave, slightly more so laterally before the acute antero-lateral angles; lateral margins sub-rectilinear and weakly convergent in posterior half, very weakly concave and more converging anteriorly; posterior margin bisinuate; along anterior mar-

gin a narrow, shiny band, hardly elevated medially, somewhat more so towards antero-lateral angles; lateral margins bordered anteriorly by a sharp-topped, narrow ridge, gradually and strongly widening, and round-topped towards the subrectangular postero-lateral angles; posterior margin only medially bordered by a very narrow band, impunctate, except for some extremely fine setigerous punctures; surface shiny, very closely set with round to elliptic, deep punctures of varying diameters, most situated at bottom of a shallow, ill-defined depression; some small areas impunctate; many punctures with an erect or weakly reclined seta; lateral ridge with a rather scanty fringe of erect setae, in general longer than the discal ones and somewhat longer in posterior direction; the fringe transgressing over a short distance on posterior margin.

Elytra: Sutural costa well elevated, round-topped, slightly widening and higher in posterior direction, a minute apical denticle is present; first and second discal costae faintly elevated, the third one not elevated, but well visible as an impunctate band between the dense punctation; a very distinct accessory costa between bases of second and third discal costae; non-costal surface shiny, closely set with horseshoe-shaped punctures, more round and umbilicate on apical declivity, more or less regularly seriate along margins of costae, subseriate to irregularly distributed for the rest; most horseshoes situated at bottom of an ill-defined depression; horseshoes and depressions somewhat coarser on anterior part of elytra; only very few setae on costae, in posterior part of elytron only; non-costal areas with sparse setae, the majority arising from very small, round punctures, a few from small horseshoes; setae seriate along external margin of sutural costa and somewhat crowded at short distance of the margins of discal costae, leaving most of the median area of intercostal surfaces unoccupied; lateral margin smooth, bordered by a sharp-topped, narrow ridge anteriorly, gradually and considerably widening, higher and more round-topped in posterior direction, obsolescent before apex; external part of ridge fringed thinly with, anteriorly, very long setae, in posterior three-fourths gradually and strongly decreasing in size, and not showing an increase before elytral apex.

Pygidium: Surface shiny, densely covered with subcircular punctures, considerably smaller than elytral horseshoes, each one with a variably long, recumbent seta; the setae often, especially along posterior margin, longer than discal setae on elytra.

Fore tibiae: Basal accessory denticles rather acute, mainly directed backward.

Middle and hind tibiae: A short, transverse, setigerous carena only present at about middle of external surface of middle tibiae.

Variation: Length ♂ 11.6 mm, ♀ 11.4 mm; apart from the usual slight variation in punctation, setosity a.s.o., some variation in development of the transverse carena on middle tibia occurs.

Type material. — Holotype ♂ (Paris), two paratypes, ♂ and ♀ (Leiden, Paris), labelled "Sumatra Palalawan", print; "Ex Museo N. van de Poll", print; "Museum Paris 1938 Coll. A. Boucomont", print; my name and (para)type labels.

Material examined. — Only the type specimens are known.

Derivation of name. — *Vulturius*, lat. = vulture; because of the carrion-feeding habits in this genus.

#### CHECKLIST TO THE SPECIES OF *Phaeochroops*

*acuticollis* Arrow, 1907; Borneo  
*angulatus* Benderitter, 1923; Palawan  
*colopacilis* Kuijten, 1981; Vietnam  
*curtulus* Schmidt, 1912; Assam  
*freemae* Kuijten, 1981; Malaya  
*gigas* Arrow, 1907; Borneo, Malaya  
*gilleti* Benderitter, 1923; Borneo  
*punctulatus* Arrow, 1942; Borneo  
*indicus* Arrow, 1907; South India  
*lakhonicus* Kuijten, 1981; Thailand  
*lansbergei* Candèze, 1876; Java  
*laotianus* Paulian, 1945; Laos  
*longisetosus* Kuijten, 1981; South India  
*ninbin* Kuijten, 1981; Vietnam  
*opacicollis* Arrow, 1909; Tenasserim  
*peninsularis* Arrow, 1909; Malaya  
*rattus* Arrow, 1909; Malaya, Sumatra and satellites, Java  
*batuensis* Arrow, 1909; Batu Islands  
*mentaweiensis* Arrow, 1909; Mentawai Islands  
*niasianus* Arrow, 1909; Nias  
*seres* Kuijten, 1981; Vietnam  
*silphoides* Fairmaire, 1898; Sumatra, Borneo, Palawan  
*recticollis* Pic, 1928; Palawan  
*taiwanus* Nomura, 1973; Taiwan  
*vulpecula* Arrow, 1909; Mentawai Islands, Sumatra, Malaya  
*vulturius* Kuijten, 1981; Sumatra



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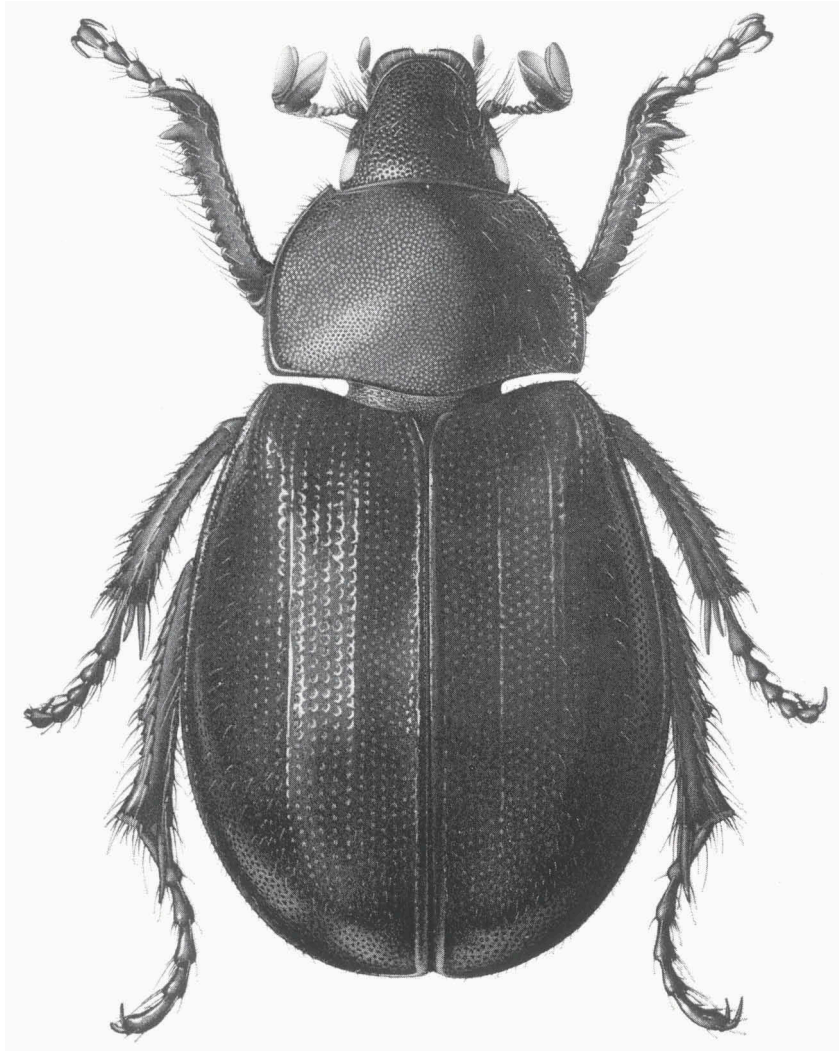
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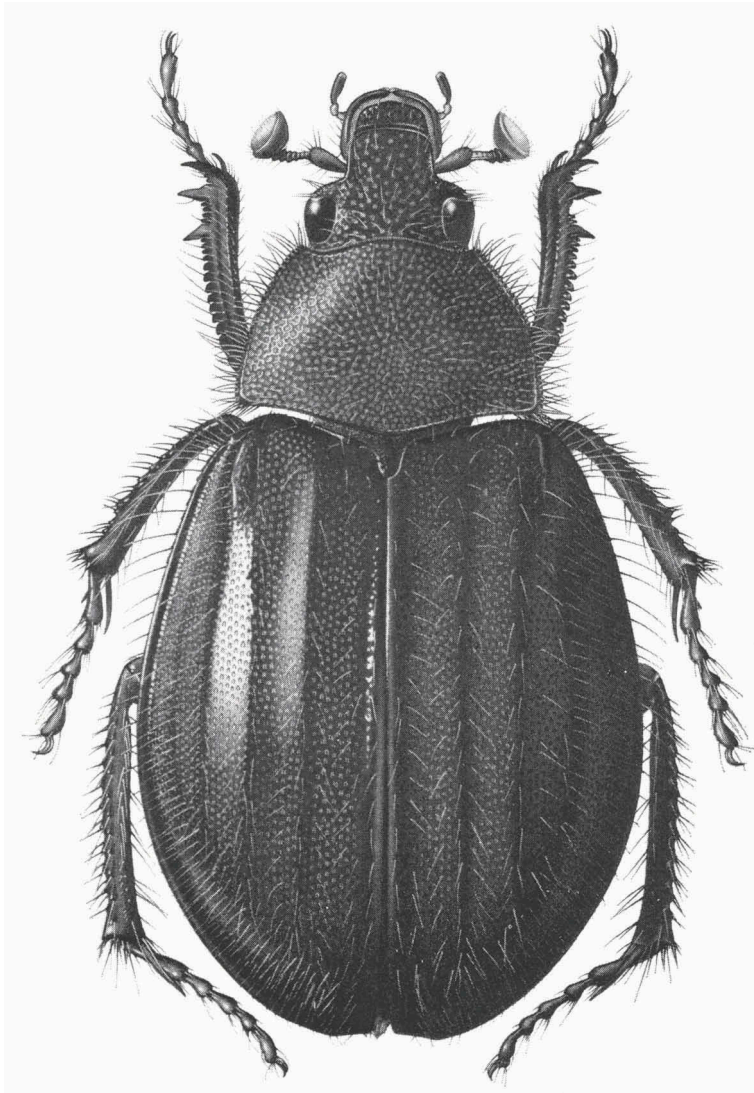
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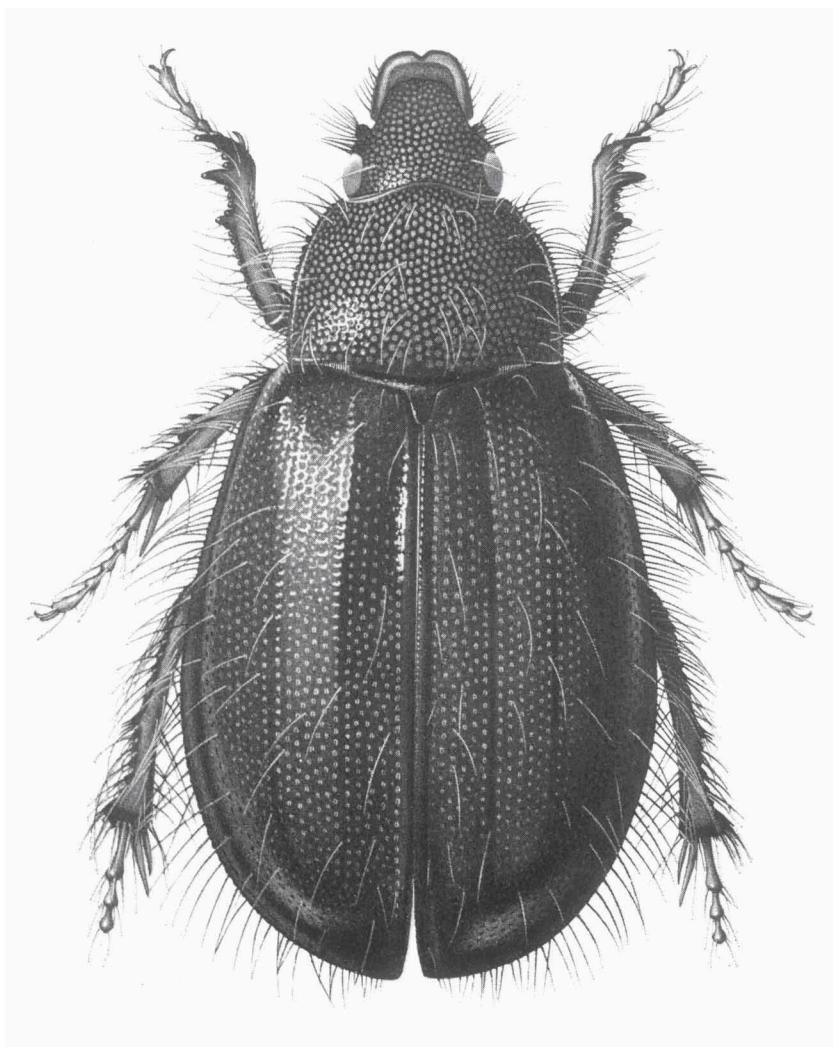
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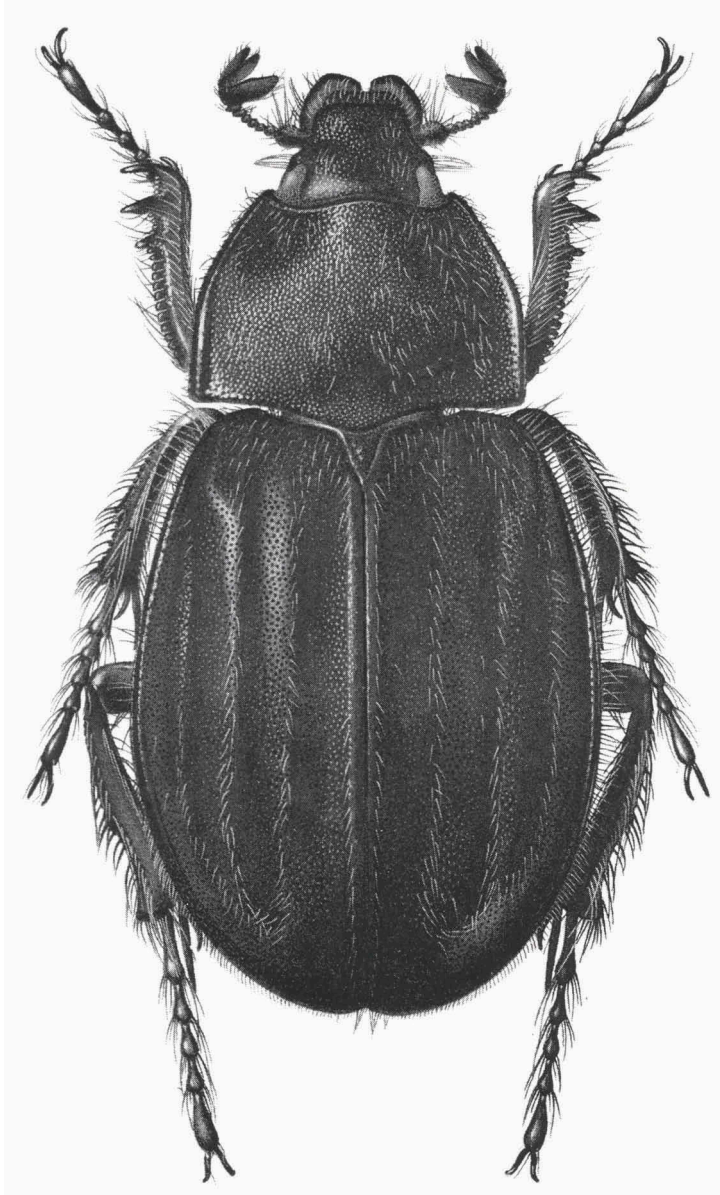
*Phaeochroops colopacilis* from Cuc Phuong, holotype; total length appr. 9 mm.



*Phaeochroops freenae* from Kuala Lumpur, holotype; total length appr. 13 mm.



*Phaeochroops longisetosus* from Coimbatore, holotype; total length appr. 9 mm.



*Phaeochroops seres* from Cuc Phuong, ♂ paratype; total length appr. 17 mm.